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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journ al and Electric Railway Review

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Making the Most Out of the Convention

THE October convention is now but little more than two weeks off, and each individual who expects to attend should plan how he can contribute to the success of the meetings, both as regards himself and the meetings as a whole. One point has already been mentioned in these columns, namely, that the delegates should aim to be present at the scheduled time for opening so that each session can start promptly. A corollary of this plan is for each delegate to attend regularly the meetings of the association in which he is most interested, and a second corollary is that he should participate in the discussion so far as he is able.

The fundamental idea of any conference is the benefit which comes through the exchange of ideas and the new conceptions thereby brought out. A study of the programs for the various meetings shows many opportunities for constructive discussion, and unless advantage is taken of these opportunities the full benefit of the meetings will not be had. To understand the truth of this statement one has only to recollect the noteworthy information brought out on the floor of past meetings, notably, perhaps, of the Engineering Association, as well as the excellent discussion which followed the report last year of the committee on merchandising transportation of the Transportation & Traffic Association.

Executives of member companies will do well to impress upon their officers and staff the great advantages and benefits that will come from their attendance at and participation in the sessions of the various associations as they take place from day to day.

Now Is the Time to Settle the Coal Strike Permanently

THIS is the time to settle the coal strike, not the strike of this year, for that is over, but future strikes, with their great attendant loss to the public. These strikes occur so frequently as to indicate that the present system of settling them is not satisfactory, at least to the general public, which is vitally interested in having a continuous supply of coal. Consequently the discussion of this subject by Secretary Hoover at this week's chemical convention in New York is most timely.

In the Secretary's opinion, the present relationship of employer and employee in the coal industry constitutes a periodical national danger, as every quarrel threatens the welfare of 99 per cent of the community who are not parties to it. These quarrels center upon various rights claimed by employer and employee, but when these rights infringe upon the public right to a supply of a necessity like coal at a reasonable price, the dominant right is that of the public.

Much of the trouble will disappear, Mr. Hoover thinks, with more regular employment in the mines, and on this point he declares that our bituminous mines are operated much less continuously than those in England and Germany, and the public obviously pays the bill of this waste of labor and capital. He then points out that greater facilities of storage of coal among the larger users, particularly the railroads and the public utilities, would help greatly in overcoming seasonal fluctuations, while a co-operative system of marketing would get better car distribution, would decrease transportation, would enable the laying down of coal in storage at points of consumption, and would consequently give more regular operation with reduced working costs. The proposed coal commission has a great opportunity for constructive work in the interests of the public.

Mayor Couzens Scents a Conspiracy

JIM COUZENS, Detroit's Mayor, came up from the bottom. He ought to know labor. It is his proud boast that he has worked with his hands. That was a long time ago. He has had lots of time since then to forget many things. One of the things that he has forgotten is that labor by and large is ungrateful. Thus Mr. Couzens is found caterwauling about something that hasn't yet happened to him, but that may happen in the future. He is visibly perturbed. It is all about the trainmen in the employ of the Detroit Municipal Railway.

As Mayor he has treated the railway employees well. He says so himself. And the facts bear him out. He did not reduce wages when wages were generally reduced. He established a trial board to investigate all complaints against employees. All this and more he has done for labor. And now Mr. Couzens sees labor about to turn against him. The men on the municipal lines who were members of the Amalgamated when the Detroit United lines were taken over threaten to turn on Jim and bite the hand that has fed them. These same men bit the hand of the Detroit United on several occasions. Apparently, they did this because the Detroit United was a private corporation without a soul, that ground the men down so that the widows and orphans among its security holders might live in luxury. But that the men should want to do the same thing to Jim after he has done so much for them is too much. It can't possibly be so.

If it is so, then there is some deep mystery attached to it all. Is some agent of the lower regions surreptitiously at work among the men to stir them up? No. Is union labor preparing to repay a debt of human gratitude in the approved union way? No again! According to a public statement of the Mayor, a number of electric railways are in a conspiracy to stir up the men, embarrass his administration and discredit municipal ownership as a policy and if possible destroy it. Can you beat it? As Spoon River says, beware of the man who rises from one suspender.

Individual Railway Experiments with Joints Have Been Costly

APROPOS of the question of policy involved in the proposal that the American Electric Railway Association appropriate funds for financing the work of the committee on welded rail joints, it is being said, in opposition to the suggestion, that the industry or the companies as a whole are continually in actual service conditions making better experiments than the committee could make. In other words, the thought is expressed in some quarters that the companies should continue their individual efforts at testing joints in service in the manner which has long prevailed and which, so far, has resulted in this lack of knowledge in regard to the relative merits of the several types of welded rail joints which confronts the industry.

The individual experiment method has, more than any other single factor, been responsible for the lack of information which the committee on welded rail joints has disclosed through its preliminary study. So long as individuals experiment each for himself, without co-ordination of effort, just so long will there be a diversity of opinion as to the results of their experiments.

The co-ordination of such individual efforts has been one of the aims of the committee because it has been found that in no other way can the industry hope to learn the fundamental facts underlying the properties of each of the several joints which have more or less use today.

Even were such efforts co-ordinated through the committee, there remains the fact that years have been required to learn some facts about welded joints which proper and scientific tests, made beforehand, would have developed within a few months. No one would think of erecting an important building without testing the soil in advance, to be certain that the foundations will spread the load. But the electric railway industry has been blindly building tracks with joints of varying merit without any real advance knowledge of their ability to withstand the stresses which come upon them.

Surely, preliminary tests can and should be made to determine how welded rail joints may be expected to perform. That it is not possible, within reasonable cost, to make tests exactly under full service conditions is not a cause for rejecting the service test scheme as proposed by the committee, because some of the best scientific minds in the country have indicated their belief that tests which will give all necessary data can be made in the manner proposed.

Individual efforts have had their day and so far have principally caused expense entries on the debit side of the ledger account against rail joints. The records of one company show this clearly. A careful account of maintenance costs for 100 miles of modern track having an average age of four years gives significant information relative to the cost for joint maintenance as compared with total maintenance for the track, and also the cost for a particular joint which caused excessive expense. Had proper tests been made before this joint was adopted an expense of more than $100,000 could have been avoided. The records indicate that 65 per cent of the total maintenance expense for 100 miles of track was confined to 11 per cent of the mileage and all of the track producing this large proportion of the total expense was laid with a particular type of joint. No doubt similar records, if kept on other properties, would show similar results.

In any event, the way engineers know that their joint experiments, individually, have been costly affairs, and as a rule the engineers are rather reluctant to admit such facts for fear of adverse criticism. And small companies, of which the industry is mainly composed, cannot afford to make costly individual experiments. This throws upon the larger companies the burden of the experiments that are made individually.

It is believed that the problems requiring solution are not such that individual experiments, by the several large railway companies only, will solve them, at least within a reasonable period of time. If the problems are to be solved in time to avoid another decade of costly individual experimentation it seems clear that the efforts toward solution must be made by the research methods proposed by the committee and the industry as a whole should at once get behind the work as a matter of policy.

Can Wheel-Tread and Rail-Head Contours Be Co-ordinated?

A LIVE question before equipment and way engineers relates to the possibility of so designing wheel treads and rail heads that they will fit together when new and thus eliminate the ironing-out process. The use of rail heads with curved contours has been ardently advocated, and the Engineering Association has thought well enough of the idea to incorporate the curved head in the standards, as has also the British Engineering Standards Committee. Australia has the curved-head rail, too. The curvature of the head in these cases was selected to fit a partly worn wheel. On the other hand the French rails illustrated elsewhere in this issue in an abstract of the report of a paper by M. Gagné, of the Paris unified transportation system, have a plane head surface which he says is best because the cylinder is the best form for the wheel rolling surface. The action of the French Light Railways Association in adopting this feature was discussed editorially in the Nov. 27, 1920, issue of this paper, page 1106.

The curved-head rail is comparatively new, but the weight of the argument seems to be in its favor. It can easily be had if desired on a large scale, as its manufacture involves no complication in rolling. It is an open question at present as to whether the same arguments apply to the wheel. Some way engineers would like to get co-operation in this matter from equipment men in the form of a wheel tread with an enlarged fillet that would more nearly conform to the contour of the rail head. They believe that wheels as well as rails would wear longer if this could be done. Equipment men are reluctant to try out this innovation on a large scale as they believe that the results would not justify the bother and expense involved. They believe that the effect of curving the contour would be only transient. However, if some road or roads would try the plan on a large scale the experiment would yield valuable data.

At a recent Engineering Association committee meeting the opinion was expressed that the subject of interrelation of wheel and rail contact surfaces has never been scientifically studied. The suggestion which followed to the effect that a comprehensive committee be appointed next year to make an all-round study of the subject is commendable. Here is a chance for engineers within one industry to get together to settle a practical matter in a practical way. The committee ought to be appointed in due course.

St. Paul Utilities Co-operate on Stray Current Control

Results of Survey Conducted by Co-operative Committee of Utilities to Determine Results of Applying Remedial Measures Suggested by Bureau of Standards — Committee Also Studied Effects of Changes in the Distribution System and Elimination of Competitive Drainage in Underground Structures

BY O. J. LENMARK
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IN 1917 the utilities owning underground structures in St. Paul, Minn., met to discuss electrolysis problems. As a result, the advice and co-operation of the Bureau of Standards was sought, and a joint investigation of return railway circuit conditions was made by the engineers of the several utilities under the supervision of E. R. Shepard, of the bureau. Later the bureau submitted recommendations looking toward improvement in the situation.

However, little was done in carrying out the bureau's recommendations until 1921, due to the unsettled condition incident to the war. In that year a working subcommittee, consisting of a technical man from each of the interested utilities, was appointed to carry out these recommendations and to determine the results.

The method of co-operating followed in St. Paul has proved very successful. Obviously, the problem of electrolysis is one that requires co-operation of all interested utilities. It is an engineering problem that is susceptible to analysis if constructive work is done by all of the parties concerned. The members composing this committee are technical men in the several operating organizations who are in constant touch with the changes in their systems which may affect the electrolysis situation. The problems are met fairly and squarely on the basis of facts, and opinions are formed from an unbiased standpoint. Any changes made on the various systems which result in a general improvement are approved by all the members of the committee before they are made permanent.

ST. PAUL'S ELECTRIC RAILWAY DISTRIBUTION SYSTEM

The St. Paul City Railway lines comprise approximately 170 miles of single track. The four principal sources of power supply are (see Fig. 2) the College Avenue substation, located at College Avenue and Wabasha Street; the Snelling substation, located at Snelling and University Avenues; the Hope Street substation, located at Hope and East Seventh Streets, and the Concord substation, located at Concord and Isabel Streets. The Concord substation was not in operation when the 1917 investigation was made.

Insulated negative feeders are installed in all of the substation districts, the system in the College Avenue district being unusually extensive. Complete data as to size, length, voltage drop, and current carried on the various feeders are given in the table, and the layout is shown in Fig. 2. This system of insulated negative feeders was installed to minimize electrolysis and it was highly commended by the bureau engineers at the time of the investigation.

In its 1917 report the Bureau of Standards stated that the St. Paul City Railway had installed a rather extensive insulated negative return system, used welded rail joints on a large part of its track and had generally good bonding on other sections. It was found that a number of failures on water and gas main service pipes and lead sheaths of cables, many of which had been attributed to electrolysis, had resulted from damage done prior to the installation of the four substations then in operation and were easily traced to conditions which had existed for a number of years previous. Many failures had occurred on University Avenue near Dale Street in the old substation district, where potential differences of 12 to 15 volts between water pipes and tracks had existed.

On the other hand, it was learned that practically no failures had occurred in some regions where conditions appeared to be most favorable for electrolytic corrosion, particularly in the Snelling substation district. Most of the failures which had occurred there were due to

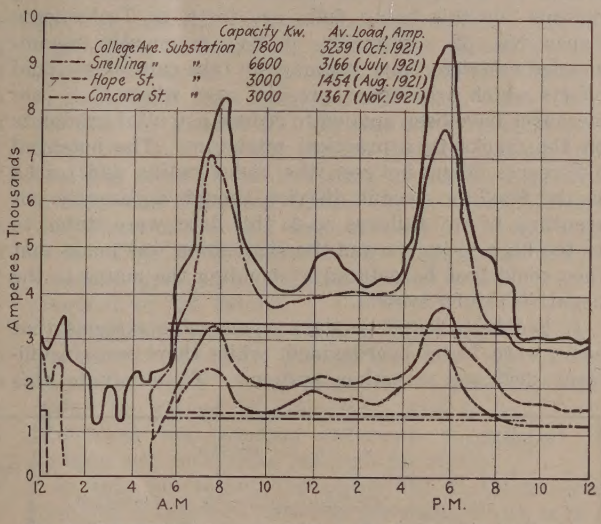


FIG. 1—SUBSTATION LOAD CURVES OF ST. PAUL CITY RAILWAY

conditions which at that time no longer existed. In some cases where serious corrosion had taken place on pipes and the cause of such corrosion had been removed the pipe failed later under abnormal strain, or due to natural rusting of the weakened pipe. Galvanic action may also have taken place as a secondary action following electrolysis from stray currents. Some of the failures reported on gas service pipes were obviously due to their proximitiy to lead cable systems which, being drained, were strongly negative to the gas pipes. Others were in regions where the corrosion could not possibly have been explained by the action of stray currents.

The rails at Rice and Rondo Streets were found to be at unusually low potential, with the water mains strongly positive to them. To correct this condition it was recommended that more current be drawn from the tracks at the substation by decreasing the resistance between rail and negative bus, and that the negative feeder be moved from Rice and Rondo Streets to Tenth

and St. Peter Streets, or that a tie be made on Tenth Street between the Rondo line and the tracks on Wabasha Street. The current on the Rondo Line could then be limited to give the best voltage conditions. The purpose of this change was to raise the potential of the Rondo Street tracks at Rice Street, where there existed a "potential sinkhole." This change would also divert more current to the Selby Street and University Avenue tracks, but should not change conditions appreciably along these lines.

It was also recommended, in order to reduce the potential gradient on University Avenue east of Hamline Avenue, that the 2,000,000-circ.mil cable on Chatsworth Street between University Avenue and Rondo Street be moved to the end of the Rondo Street line. The effect of this change would be to load that portion of the Rondo Street line west of Chatsworth Street then practically idle and correspondingly reduce the load on University Avenue. As this change would have only a minor effect on the potential gradient along University Avenue, it would not justify any great outlay of capital, particularly as the positive condition of the pipe on University Avenue can be reduced by other means.

The Bureau of Standards stated that it had consistently maintained that pipe drainage as a principal means of electrolysis mitigation is objectionable, the reasons for this being fully set forth in Technologic Paper No. 52. However, it had frequently recommended restricted pipe drainage to take care of residual effects which are always present, even where elabo ate measures have been applied to reduce potential gradients on the tracks to a practical minimum. The potential differences found between the water mains and tracks in the Snelling Avenue district, though apparently not resulting in any failures up to this date, were stated to be too high to ignore and the suggestion was made that they could best be reduced by bonding the mains to the negative return system.

It had been found on the various cable systems that some were being overdrained, while there was insufficient drainage on other systems. To eliminate this hazard, the bureau recommended that means be provided to control and measure the current, and to equalize the potential between the various structures.

The Bureau of Standards' recommendations were made to cover conditions existing in 1917. After that year, however, several changes in the system have been made, such as the installation of the new Concord substation, some track extensions and a few minor changes in the cable and pipe systems. By 1921, when the work was taken up again, much preliminary testing became necessary to determine whether the changes recommended in 1917 still held. The committee then carried out on all the structures the suggested methods of mitigation, conforming to the general intent of the recommendations of the Bureau of Standards. A complete survey was then conducted along the lines of the bureau's survey of 1917.

The work consisted chiefly of the following items: (1) Preparation of load curves over a twenty-four hour period for the four substations, and determination of (2) potential drop and current flow in the negative return feeders, (3) potential gradients on tracks, (4) potential difference measurements; (5) current flow on gas pipes at numerous locations; (6) current flow in drainage cables connected between the various underground structures and the railway negative return system over a twenty-four hour period.

The loads on the Snelling and Hope Street substations were found to be about the same as in 1917, while the College Avenue substation load was considerably lighter due to the addition of Concord substation.

Of the eighty-four gradients which have been calculated, 25 per cent exceed 0.5 volt per thousand feet; and 6 or 7 per cent equal or exceed 1 volt per thousand feet. In 1917, they were 35 and 9 per cent respectively.

A few high gradients were found in the Hope Street district, where track repairs were being made when these measurements were taken, and it is believed that this temporary condition was the direct cause of these high readings. See Fig. 3.

As the raising of the potential at Rice and Rondo Streets would require the laying of one block of conduit

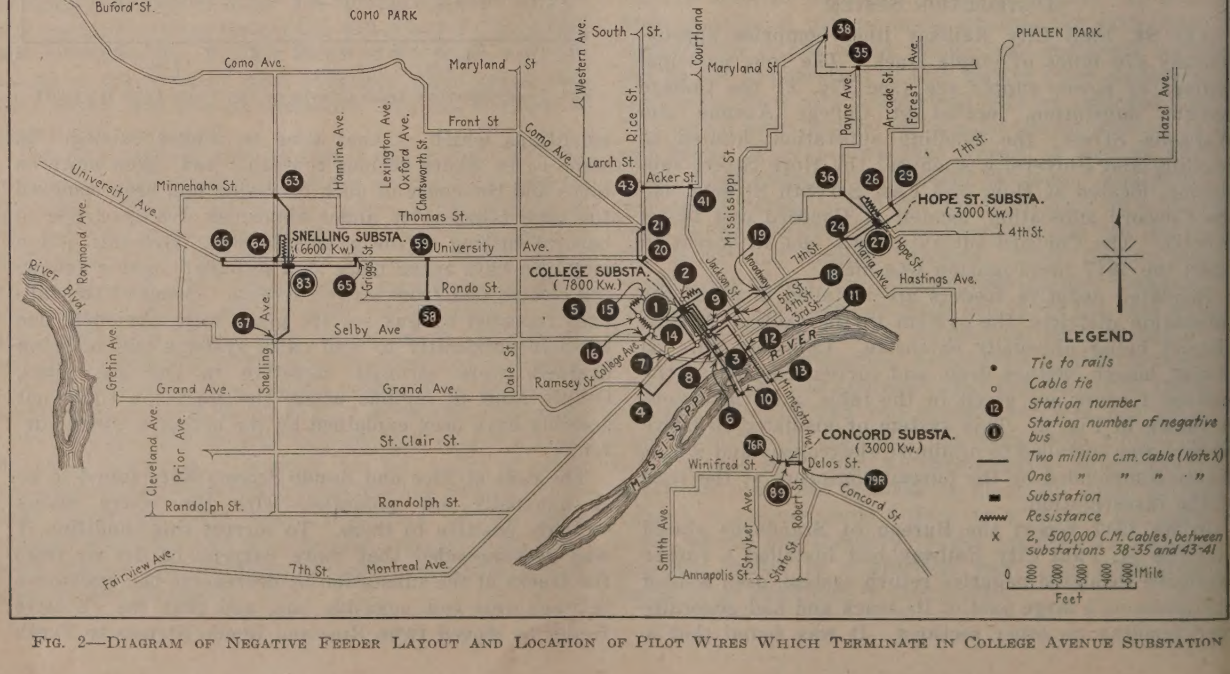


FIG. 2—DIAGRAM OF NEGATIVE FEEDER LAYOUT AND LOCATION OF PILOT WIRES WHICH TERMINATE IN COLLEGE AVENUE SUBSTATION

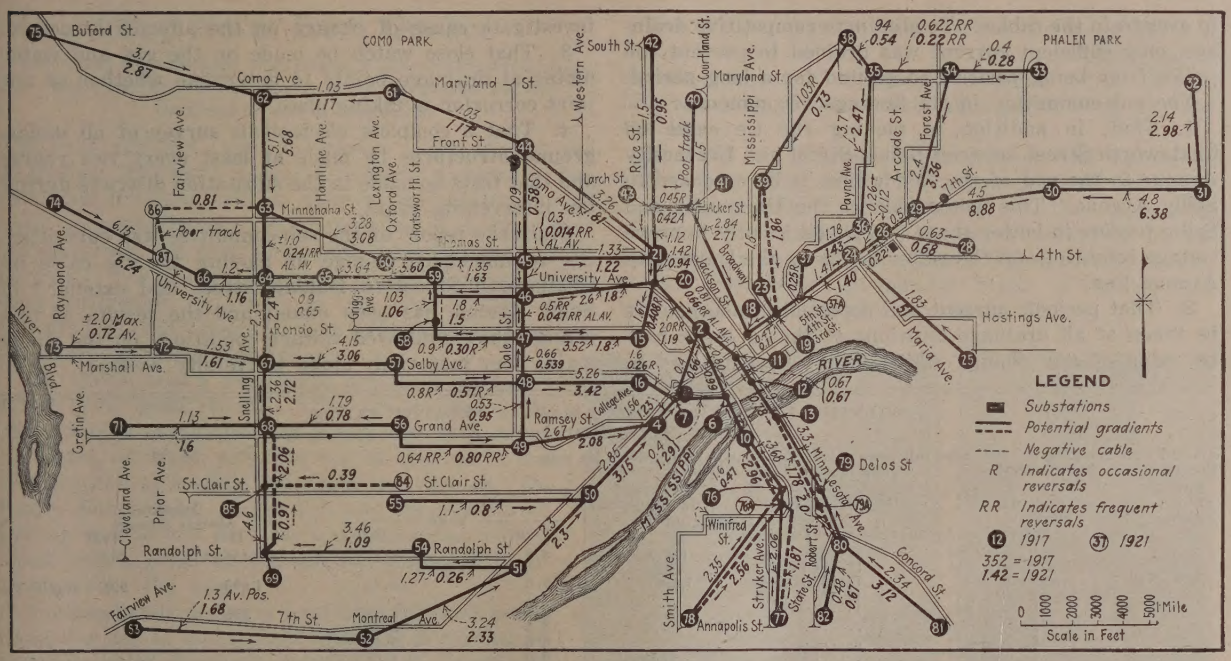


FIG. 3—TRACK POTENTIAL GRADIENTS

in a paved street and a 2,000,000-circ.mil cable, results essentially the same have been obtained by lowering the resistance in the feeder at College and Wabasha Streets to rails, and inserting additional resistance in the Rice and Rondo Streets feeder. At Snelling and University Avenues, the resistance in the feeder was reduced to lower the potential at this point in order better to balance the feeders.

In analyzing conditions from Fig. 4, it is seen that the feeders at University and Rice Streets, Rondo and Rice Streets and College and Selby Avenues are well balanced in good shape and that the water-main potentials are considerably improved.

As recommended by the Bureau of Standards, three drainage connections to water mains were installed in the Snelling substation district. These drainage connections have greatly reduced the positive potential differences between water main and rails. However, until it is determined whether or not joint corrosion is taking place, it will not be possible to regard conditions in this district as satisfactory. In order to determine whether or not joint corrosion is taking place, it will be advisable to make periodic inspection of the joints in the water main near the drainage points.

A complete electrolysis survey was made on the water mains in the Snelling Avenue and Hope Street districts. A number of measurements were also made in the vicinity of Rice and Rondo Streets. These are the districts where the pipes were known to be in danger. A comparison of the survey with that of the Bureau of Standards shows considerable improvement. This is due to pipe drainage installed in the Snelling Avenue district, and improved balancing of the negative feeders in the vicinity of Rice and Rondo Streets. A study of conditions in the Hope Street district revealed the existance of a positive area along the Hope Street and Maria Avenue car lines. This condition is unquestionably due to the high potential gradient on the East Seventh Street line and no doubt will be removed after track repairs are completed on this line.

As a result of the efforts made by the St. Paul City Railway and the various interested utility companies, the electrolysis conditions on the water system have been greatly improved. Since 1917, only three failures due to electrolysis have occurred. Of these three, one, in the Snelling Avenue district, was due to present conditions; one, in the College Avenue district, was due to the breaking down of the insulation of the negative-return system; and the third, in the College Avenue district, was due, undoubtedly, to conditions which no longer exist. Pipe failures, due to electrolysis, are now less frequent than formerly, and should become still less frequent in the future.

No attempt has been made to drain the distribution gas mains. However, a 16-in. cast-iron, high-pressure gas main which is not connected to the distribution mains is drained at University Avenue and Dunlap Street, as the potential difference of rails at this location was considered too high for safety.

In this connection, the possibility of using cement joints on a new 6-in. cast-iron gas main, which is to replace a 3-in. cast-iron main in the College Avenue district, was brought up before the sub-committee. The committee felt that the insulating cement joint, which preserves a high resistance over a long period of time, would improve electrolysis conditions on the gas mains in this vicinity very materially. Special precaution, however, would be needed in making these joints to prevent metal-to-metal contact between bell and spigot ends in the joint due to expansion.

It was further suggested that the service pipes in this insulated section be prevented from making electrical contact with other systems by the use of insulating joints within the premises served, as stray currents could enter from the water system through gas water heaters and other appliances with which it comes in contact, and injury would result to both the service and the section of the main to which it connects. In this specific case, it will be necessary to install a few cement joints on the cross mains which connect the insulated sections so as not to concentrate the potential at the insulated sections. On the cable systems care was taken not

to overdrain the cables. To eliminate competitive drainage, only sufficient current was drained to prevent the cables from being positive to ground for a long period.

The sub-committee in its findings recommends:

1. That, in addition to moving the tie cable on Chatsworth Street between Rondo Street and University Avenue to the end of the Rondo line, it be extended to Selby Avenue. This would balance the University and Selby feeders in better shape and would greatly improve voltage conditions on the water mains on the University Avenue line.

2. That periodic current and potential measurements be taken at all drainage locations so that a check may be made of any change which might happen; and to investigate cause of change on the affected structure.

3. That close watch be made on the gas and water mains at drainage points to determine whether or not joint corrosion is taking place.

4. That a complete electrolysis survey of all underground structures be made at least every two years; and that tests be made in the substation districts during the intervening years.

Since the report of the sub-committee was submitted, the recommended change of moving the tie cable on Chatsworth Street to Dunlap Street and extended to Selby Avenue has been made; and the results of this change show improved voltage conditions on the water mains very materially along University Avenue.

POTENTIAL DROP AND CURRENT FLOW IN NEGATIVE CABLES

St. Paul, 1917–1921

All cables are 2,000,000-circ.mil unless otherwise noted. For location of the cables, see map.
Roman type = 1917 readings. *Italic type = 1921 readings.*

From Station Number	To Station Number		Cables Number	Distance (In Feet)	Volts 1917	Volts 1921	Amperes, All-Day Average 1917	Amperes, All-Day Average 1921	
	(a) College Avenue Substation District:								
2	1	Neg. Bus	15–109	134.5	8.3	*5.8*	156 (A)	*365*	
3	1	Neg. Bus	15–101 15–103 15–104	1,634	5.0	*2.94*	1,690	*991*	Cable Tie
4	1	Neg. Bus	15–102 (B)	5,265	8.9	*6.58*	336	*265*	
6	1	Neg. Bus	.....	.....	8.8	*4.48*	.....	.....	
7	1	Neg. Bus	.....	.....	8.6	*5.77*	.....	.....	
8	1	Neg. Bus	.....	.....	8.0	*4.39*	.....	.....	
9	1	Neg. Bus	15–107	2,325	7.2	*3.4*	568	*277*	Cable Tie
10	1	Neg. Bus	.....	.....	10.0	*4.7*	.....	.....	
11	1	Neg. Bus	.....	.....	9.4	*4.78*	.....	.....	
12	1	Neg. Bus	15–105	4,422	9.5	*4.4*	395	*175*	
13	1	Neg. Bus	.....	.....	9.2	*4.89*	.....	.....	
14 Neg. side of res.		Neg. Bus	15–106	1,161	4.82	*3.51*	760	*560*	
15	1	Neg. Bus	.....	.....	9.0	*7.19*	.....	.....	
16	1	Neg. Bus	.....	.....	7.2	*6.64*	.....	.....	
18	1	Neg. Bus	.....	.....	8.8	*5.72*	.....	.....	
19	1	Neg. Bus	.....	.....	8.8	*5.84*	.....	.....	
20	1	Neg. Bus	15–108	2.792	9.65	*7.79*	630	*520*	
21	1	Neg. Bus	.....	.....	10.3	*9.39*	.....	.....	
7	3	Neg. Bus	15–101	1,962	3.6	*2.5*	336	*237*	
8	3	Neg. Bus	15–103	717	3.0	*1.75*	770	*453*	
9	3	Neg. Bus	15–104	689	2.2	*0.95*	590	*257*	
6	8	Neg. Bus	15–103	350	0.55	*0.098*	290	*51.9*	
10	6	Neg. Bus	15–103	1,933	1.46	.....	140	.....	
6	*10*	*Neg. Bus*	*15–103*	*1,933*	.....	*0.479*	.....	*46.1*	
11	9	Neg Bus	15–104	505	1.7	*1.24*	630	*455*	
18	9	Neg. Bus	15–107	930	2.47	*1.29*	488	*257*	
19	18	Neg. Bus	15–107	1,441	0.39	*0.117*	50	*14*	(*Al. Av.*)
13	12	Neg. Bus	15–105	1,613	0.88	.....	100	.....	
12	*13*	*Neg. Bus*	*15–105*	*1,613*	.....	*0.78*	.....	*89*	
16	14	Neg. Bus	15–106	1,272	2.08	*2.79*	300	*406*	
15	5	Neg. Bus	15–106	1,278	1.9	.....	273	.....	
15	*14*	*Neg. Bus*	*15–106*	*1,278*	.....	*3.5*	.....	*178*	
21	20	Neg. Bus	15–108	1,142	1.36	*0.94*	220	*152*	
38	35	Neg. Bus	Tie	2,600 (C)	0.9	*0.54*	35	*19.2*	
43	41	Neg. Bus	Tie	2,550 (C)	0.37 (R)	*0.42 (R)*	15	*14.02*	
58	59	Neg. Bus	Tie	1,600	0.88	*1.06*	110	*120.6*	
79	76	Neg. Bus	Tie	900	1.5	.....	110	.....	
			(This tie removed)						
	Drainage current from Tri-State cables							30	
	Drainage current from Tri-State cables							*18.43*	
	Drainage current from street railway cables							*18.9*	
	All-day average station load							4,567	
	All-day average station load							*3,239*	
	(b) Hope Street Substation District:								
24	27	Neg. Bus	29–103	1,879	2.98	*2.72*	292	*269*	
26	27	Neg. Bus	29–102	80	2.10	*2.85*	510 (A)	*306*	
29	27	Neg. Bus	29–104	854	2.55	*3.49*	550	*760*	
36	27	Neg. Bus	29–101	2,277	2.9	*1.7*	234	*139*	
	All-day average station load							1,586	
	All-day average station load							*1,454*	
	(c) Snelling Avenue Substation District:								
63	83	Neg. Bus	16–101	2,954	12.0	*14.6*	745	*920*	
64	83	Neg. Bus	16–105	100.5	11.1	*11.5*	165 (A)	*138*	
65	83	Neg. Bus	16–103	2,676	10.3	*9.94*	710	*647*	
66	83	Neg. Bus	16–104	2,541	10.4	*7.8*	750	*691*	
67	83	Neg. Bus	16–102	3,460	13.0	*18.03*	690	*968*	
	N. W. Telephone Company's cables							32	(A)
	N. W. Telephone Company's cables							*35*	
	Street Railway Company's cables							55	(A)
	Street Railway Company's cables							*22*	
	All-day average station load							3,149	
	All-day average station load							*3,166*	
Resistance in 16–105 was decreased at substation to balance feeders in better shape.									
	(c-1) Snelling Avenue Substation District:								
63	*83*	*Neg. Bus*	*16–101*	*2,954*	.....	*12.04*	.....	*760*	
64	*83*	*Neg. Bus*	*16–105*	*100.5*	.....	*10.58*	.....	*158*	
65	*83*	*Neg. Bus*	*16–103*	*2,676*	.....	*11.84*	.....	*768*	
66	*83*	*Neg. Bus*	*16–104*	*2,541*	.....	*9.65*	.....	*756*	
67	*83*	*Neg. Bus*	*16–102*	*3,460*	.....	*17.4*	.....	*893*	
	Northwestern Telephone Company's cables							*35*	
	Street Railway Company's cables							*22*	
	All-day average station load							*3,392*	
	(d) Concord Substation District (in service since Jan. 29, 1918):								
76-A	*88*	*Neg. Bus*	*33–101*	*816*	.....	*2.93*	.....	*667*	
79-A	*88*	*Neg. Bus*	*33–102*	*756*	.....	*1.42*	.....	*350*	
79-A	*88*	*Neg. Bus*	*33–103*	*739*	.....	*1.39*	.....	*350*	
	All-day average station load							*1,367*	

(A) = Measured at substation. (B) = Cables vary in size. (C) = 1,000,000 circ.mil cables.

Shop Notes from Quebec

While Local Maintenance Equipment Follows Standard Lines, the Practices Which Have Been Developed Show Originality and Adaptability

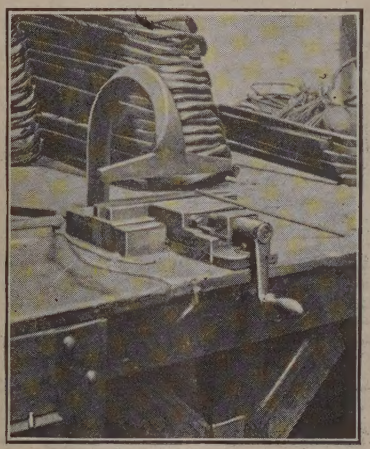
PETER QUINN, who is master mechanic of the Quebec Railway, Light & Power Company, has developed his shop with a view to the minimizing of labor in maintenance. His equipment is neither new nor elaborate, but what he has available he uses to good purpose. The general features of the Quebec system were outlined in an article in the issue of this paper for May 27, 1922. Some further items with particular reference to the shop follow:

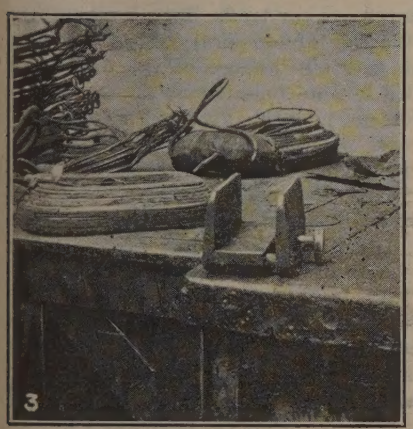
Mr. Quinn uses a home-made armature coil press which gives good results. (See illustrations.) It consists of a crank-operated bench vise with liners by means of which pressure can be applied to the straight coil side while hot from the varnish. To insure compactness of the coil and smoothness of the top and bottom surfaces a pressure bar is provided with a pedal mechanism for pulling it down firmly above the vise.

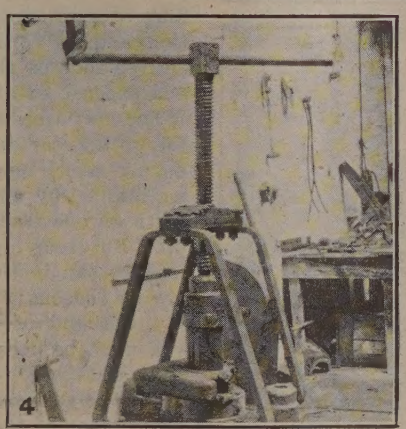
Another handy device is a rotating field-coil bench clamp for use in taping field coils. It is carried on a spindle which drops into a socket in the bench top. Still another device is a screw press for pressing motor bearings into and out of housings. The accompanying illustrations tell the story in these two cases.

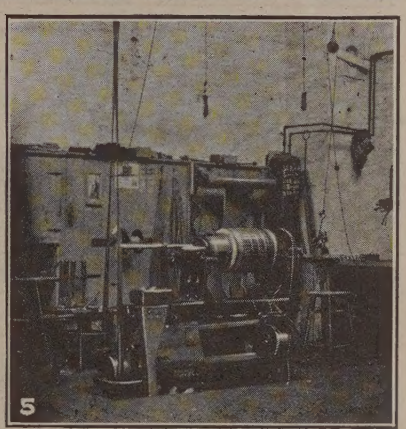
One of the greatest conveniences in the shop is a liberal use of trolley bar for the transportation of armatures, etc., from point to point. Two of the accompanying pictures were taken particularly to show the bar.

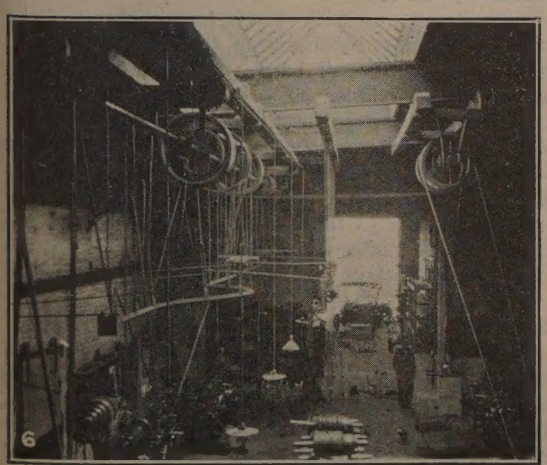
The bar is of cross-shaped section, the wheels of the trolley rolling on the horizontal surfaces, the upper limb being used for attachment of the supporting clamps. Switches in the bar permit shifting of the trolley from one bar to another. There are, of course, several successful commercial types of trolley bar which are suitable for this purpose.

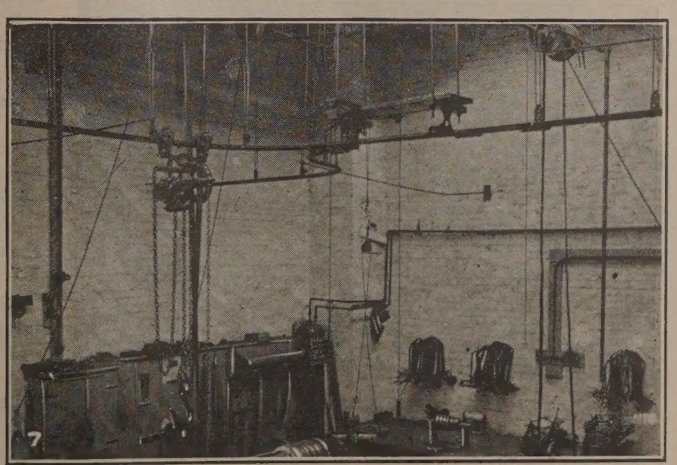






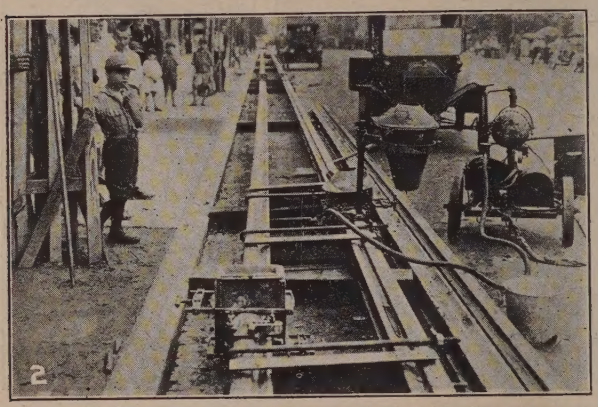


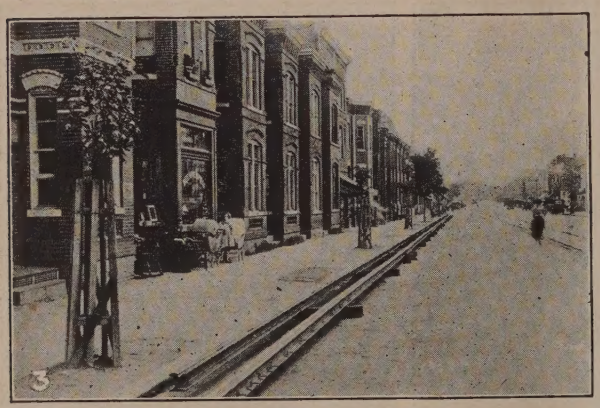




THE EDITORIAL CAMERA INVADES THE QUEBEC SHOPS

Nos. 1 and 2. This coil press turns out a smooth, compact coil.
No. 3. A rotating field coil vise facilitates taping.
No. 4. Press for inserting bearings in housings and removing them.
No. 5. Armature banding corner in the Quebec shops showing convenient belting connection.
Nos. 6 and 7. The trolley bar is a useful adjunct in the machine shop (left) and armature shop (right).





HANDLING AND WELDING RAIL SECTIONS IN WASHINGTON

No. 1—Ramming up self-luting mold box.
No. 2—Rails lined up parallel to each other on side of street preparatory to welding. One rail is being pre-heated.
No. 3—Two lengths of seven rails each at side of street after being welded. Each length 420 ft. long.
No. 4—Lifting seven lengths of welded rails into position alongside track.

Track Relaying Accelerated by Installing Pre-Welded Rails

Rails Were Welded at Side of Street and Transported to Position Alongside Track During Daytime, Then Installed in Permanent Location at Night

BY C. S. KIMBALL
Engineer Way & Structures, Washington Railway & Electric Company, Washington, D. C.

DURING the course of some track relaying work the Washington Railway & Electric Company, Washington, D. C., recently adopted an economical method of installing and Thermit-welding new rails. This resulted in a considerable saving in time and cost as compared with the usual method of procedure and was accomplished without interruption to traffic.

The replacement consisted of 7,000 ft. of fourteen-year-old double track on H Street between North Capitol and Fifteenth Streets, N.E., with new 6-in. L.S. Co. 120-513 Trilby rail, a special rolled section, which is a modified A.E.R.E.A. rail made to conform to the special requirements of the conduit current distribution system installed in Washington. Normally three to four minute headways are maintained over this line, with one to two minute headways, lasting about two and one-half hours, during the morning and evening rush-hour periods. In addition to this service the heavy interurban cars of the Washington, Baltimore & Annapolis Electric Railway also operate over these tracks. It was, therefore, important that this frequent car operation be not interrupted. There were no adjacent parallel lines over which to reroute car traffic during rehabilitation, and the construction of temporary crossovers was entirely out of the question because of the difficulties and expense entailed by the conduit system.

The only time for carrying on this work without interrupting car traffic was between 1:30 and 5 a.m., during which period a half-hourly "owl" service was maintained by one car, which could be routed back and forth on one track, while the other track could be torn up. But relaying track over a conduit system takes longer than in the case of ordinary track for the following reasons:

1. Instead of simply spiking the rail to ties each rail must be bolted with four hook-bolts to the conduit yoke seats which support the rails at 5-ft. intervals
2. The yoke seats allow less room than ties for lateral adjustment of the rail.
3. The rails of a conduit system have to be surfaced much more carefully, by inserting steel filler plates between yoke seat and rail base (rather than tamping material under the ties, as in ordinary track) in order not to cause misalignment of the plow contact shoe, and hence possible breakage of the porcelain and cement insulations from which the conductor rails are suspended.

For these reasons, therefore, also because of the short, costly and ineffective periods of night labor, the work threatened to become unduly expensive and would have failed to keep pace with the progress of the preparatory work of removing the pavement.

Night labor costs, however, were greatly reduced and the speed of the work accelerated by laying the rails to be installed along the side of the street, parallel to the track, welding several lengths together during the day time and transporting them close to the edge of the track, then, during the early hours of the morning, removing the old rails and installing the new, welded lengths. If there was not time to weld the free ends

of the welded rail lengths to the ends of the rails already installed, these joints were temporarily bolted, and Thermit-welded on another night. The new rails were temporarily bolted to every fifth yoke seat, or at intervals of 25 ft. Except where especially low joints occurred, surface plates were not inserted until later during a day period, when the temporary bolts were removed, the base of the rail wedged, plates inserted and the rail base bolted permanently to the yoke seat.

The number of rails per unit to be first welded together at the side of the street depended on the length of space uninterrupted by cross-streets along the curb adjacent to the place of installation. In most cases these welded rail lengths included three or four 60-ft. rails. In one case, on H Street between Twelfth and Thirteenth Streets, a pair of rail lengths was each comprised of seven rails making continuous lengths of 420 ft. each.

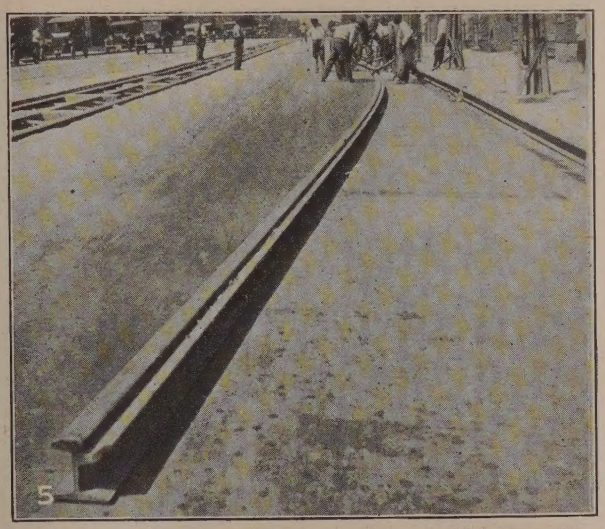
Before welding the rails at the side of the street each set of rail lengths were mounted on wooden cross ties cut in half, lined up parallel to each other and carefully surfaced by placing shims under the joints to be welded. The rails to be welded were kept in accurate lateral alignment by spacing the parallel rails evenly by means of three sections of I-beams, as shown in an accompanying illustration, which were cut to similar size. The rails were clamped together with eight bolts, four of which were clamped around the rail heads and four around the rail bases. Welding was then performed by means of the Thermit insert welding process. After the welds were made the welded rails were removed from the blocks and replaced by a set of unwelded rails.

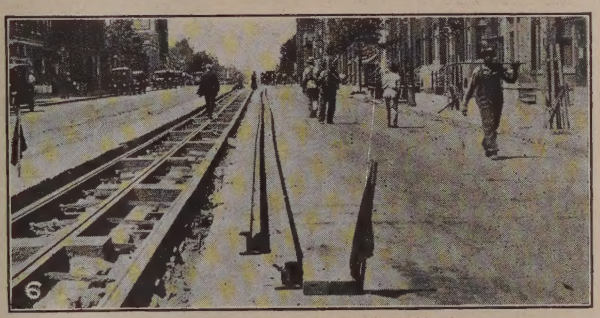
When the time came to transport the welded rails to the edge of the track gangs working on four-men rail tongs lifted them over. In the case of the seven-rail lengths, twenty men on five rail tongs were used, with five men prying the rail with slot bars, making twenty-five men in all. Efforts were concentrated on moving only one portion of this flexible unit at a time by successively shifting one end, then the middle, then the other end half way across the street. By repeating these operations once more the total lateral shift of about 18 ft. from curb to track was completed. The two seven-rail lengths were thus shifted laterally in three-quarters of an hour. Each multiple unit was then in turn placed on pipe sections as rollers and tugged along parallel to the track by means of a Fordson tractor to a position next to where it was to be installed. In the future low dolly trucks, equipped with center wheels of slightly longer diameter to facilitate free changes of direction, will probably be substituted in place of the pipe sections. Only a few minutes were required the following night for seven rail-tong teams to place the 420-ft. rails upon the yoke seats and bring one end flush with the rail already installed by battering the other end with a loose rail.

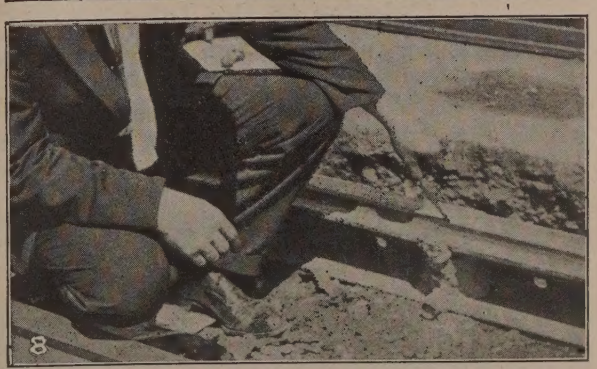
This reconstruction work was in direct charge of George Mahoney, supervisor of construction, and under general supervision of H. Jackson, supervisor of underground lines. The welding gang included a welding crew and a grinding crew, both under one foreman. Duties were arranged as follows:

Welding crew (six men)—one man for making molds; two men for aligning, surfacing and clamping rail; two men for applying molds, preheating and pouring; one man for removing and cleaning up molds, also other cleaning up work.

Grinding crew (five men)—two men on one grinder,

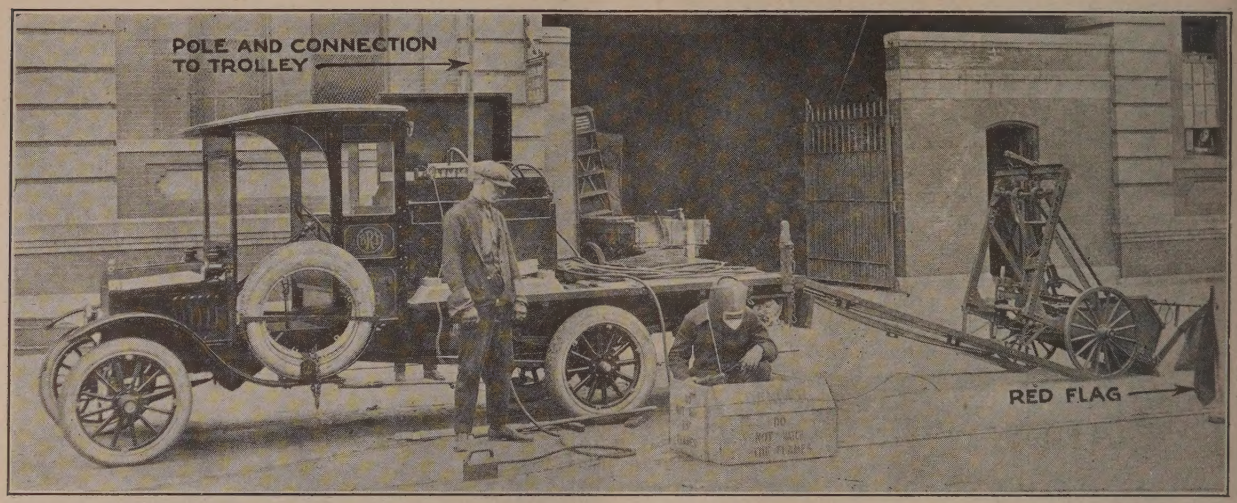






RAIL LENGTHS OF 420 FT. ARE HANDLED AS UNITS

No. 5—420-ft. length of rail partly lifted across street after being welded at curb.
No. 6—Two pairs of rails each welded from seven rail lengths in place alongside track for installation at night.
No. 7—Fordson tractor pulling 420 ft. of rail into position alongside track.
No. 8—Close-up of Thermit insert weld after installation.



HERE IS THE B. R. T. WELDING AND GRINDING APPARATUS READY FOR WELDING

grinding head of rail; two men on a second grinder, grinding weld at gage line; one man on small hand grinder, for finishing off grinding work.

COSTS OF WELDING RAIL JOINTS

	No. of Joints Considered	Labor Cost Per Joint	Material Cost Per Joint	Total Cost Per Joint
1 Welding	105	$2.88	*$8.13	*$11.01
2 Thermit supplies and equipment (not including materials actually used up in welding)	500	.....	.55	.55
3 Manufacture of rail clamps and blocking for rail (for using special welding method described)	500	.41	.22	.63
4 Extra handling of rail (for using special welding method described). Putting rail on blocks and removing after welding	170	1.33	.....	1.33
5 Grinding (estimated only, because work not completed at this time)	.....	1.00	.50	1.50

Practically speaking, should additional welding be contemplated the cost of Items 2 and 3 would actually be much lower, as these materials will still be serviceable for additional work at the completion of this job.

As the work progresses the unit cost of Items 1 and 4 will be considerably decreased as the welding crew becomes more expert in applying the new method.

* Had the new "center pour" Thermit insert weld been used the material cost of welding per joint would have been only $5.50 and the total cost of welding per joint $8.38.

The cost of Thermit-welding rail joints on this job, up to and including Aug. 8, 1922, was as shown in the accompanying table.

Taking the Arc Welder and Rail Grinder to the Job

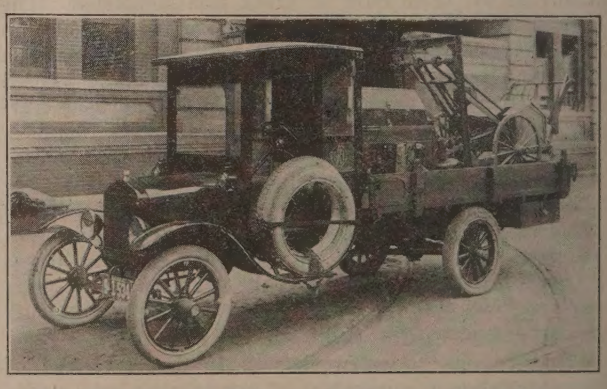
This Automobile Welding Equipment Recently Assembled in Brooklyn Provides for Speed in Dispatching the Apparatus to the Line

ONE of the more recent developments in the use of the arc welder in the repair of defective joints and special trackwork has been along the lines of portability. The portability feature was necessary so that sites of emergency repairs could be reached more quickly than can be done under the customary scheme of hauling the individual welder to the job.

Under this scheme it is necessary to haul the equipment from job to job, which in turn requires careful routing of an automobile to haul the equipment about and later requires the additional haulage of grinding equipment. Where emergency arc-welding repairs are needed, this all consumes a great deal of time and there is considerable lost time due to delay because of the difficulty closely to follow the welding work with the necessary grinding work. The latter should be done immediately, if the best results are to be obtained in the repairs to cupped joints or to defective parts of special trackwork.

The automobile welding equipment shown in the accompanying views was assembled by the way and structures department of the Brooklyn Rapid Transit System, in order to facilitate the work of emergency repairs. The equipment consists essentially of a 1½-ton Ford automobile having an Olsen extension and carrying a body which was designed by the surface track division under the general supervision of C. L. Crabbs, chief engineer of way and structures.

Removed from its usual running gear, a Type "W" Rail Welding & Bonding Company dynamotor welding outfit is mounted on special supports on the truck body immediately back of the cab. There is space between the welder and the tailboard of the truck body for the special swing-frame-type grinding equipment, which has been developed in Brooklyn for the particular needs of grinding special trackwork and minor welds at joints.



B. R. T. EMERGENCY WELDING AND GRINDING OUTFIT READY TO MOVE

The sides of the truck are removable and are made to act as skids upon which to load and unload the grinding equipment. One of the views shows a block and tackle, temporarily installed for assisting in loading the grinder, but the outfit is now equipped with a small winch which better serves this purpose. The auto driver acts as a helper for the welder man, making a crew of two required to operate the outfit.

Inter-Operation Problems of Frankford Elevated

Use of Improved Features in Design Made Inter-operation with Present Equipment of Other Lines Impossible—Battery Control Adopted to Facilitate Use of Electric Couplers

By J. N. Dodd
Consulting Engineer

THE Frankford Elevated was built by the city of Philadelphia as part of an extensive system of municipally owned high-speed transit lines. In order to use it to advantage before the rest of the system is constructed, it was designed to be linked up with the Market Street subway and elevated line of the Philadelphia Rapid Transit Company, so that, assuming that a satisfactory operating contract could be arranged, the road would be operated as an extension of that line. The road is being equipped by the city, but even before the operating contract was signed by the company the engineers of both the company and the city were in close contact on all details of the determination of the equipment.

UNDERFRAMING AND EQUIPMENT

The existing cars of the Market Street line have line control. If the road was to be an extension, it would be necessary that the cars of either line should be able to run over the entire system. Satisfactory operation would be impossible if the Frankford cars were able to run only as far as the southern terminus, almost a mile from the center of the city, and the passengers were there compelled to transfer to the cars of the Market Street line in order to reach their destination.

Operation of the Frankford cars over only a portion of the Market Street line would be entirely impossible; that is, to have the Frankford cars run through the business center but no further. The interval between trains over that part of the line is already extremely close. For a portion of the rush hour there is a train every ninety-five seconds as far as Sixty-third Street, almost to the end of the line. It would be a physical impossibility to increase this service by the addition of the Frankford cars and still maintain a safe distance between trains. The only way to accommodate the Frankford cars in the subway would be for them to take the place of the Market Street cars when they enter the subway and to run to the end of the line and carry the Market Street traffic. It follows also that the track equipment of the Frankford line must be such as to accommodate the Market Street cars.

For this reason interchangeability of equipment also at first appeared desirable, at least to the extent that the new cars and the old should be able to run in the same trains. However, a brief consideration of the facts showed that this was impossible for a few years to come. The Market Street cars are equipped with a type of coupler which has given great satisfaction for many years on this as well as on many other roads. However, it is not automatic and it does not make the electric connections between the cars. It was realized that economy of operation demands an automatic coupler, which permits the cars to couple by impact; that is, by the mere bringing of them together. The coupler should also make the air-brake connection between the cars and simultaneously it should make the electric connections. Ordinarily it requires a considerably longer time to make the electric connections than the air, and some claim that three-fourths of the value of the automatic coupler lies in the electric features.

There is no modern coupler which can connect with cars on the Market Street line, and as no provision has been made for buying new couplers for the existing cars, operation of the two types of cars in the same train is an impossibility for some time to come. With

EXTERIOR SIDE VIEW OF FRANKFORD ELEVATED CAR

this given as one of the conditions, the engineers felt free to consider carefully the advance which has been made in all details of car equipment to find out what was best without being bound by the requirement that the new cars should be able to run in the same train with the old ones.

Improved Brake and Other Equipment Adopted

The latest type of brake equipment has several improvements over the type on the Market Street cars. While the equipment on the old cars represented what was at that time the latest advances in the art, subsequent experience has shown the need of further refinements and additional features to meet the exacting requirements of modern rapid transit service. The new equipment has a much higher air pressure (and therefore brakeshoe pressure) for emergency application than has the old and a plentiful supply of air at this pressure, the purpose being to obtain the quickest possible stop when necessary. With the new equipment the brakes are applied automatically whenever the brake pipe pressure falls to a predetermined figure, whether this lowering in pressure is done designedly or inadvertently by the motorman, or whether it is due to leaks or even to failure of the compressor.

The control of the new brakes is such that in the event of failure of the electric control the brakes are controlled pneumatically without further action on the part of the motorman. It has many other refinements of greater or less importance. However, the control of the two types of brakes is radically different in that both cannot be run in the same train without abandoning the electric control. Electric control is such an important feature that its abandonment could not be considered.

The door-operating equipment has been improved so as to halve the operating cost and at the same time increase the safety. Operation has shown the need of an emergency system of lights which would be effective in case of failure of the power from the third rail. It was also desired to have the front and rear train marker lights supplied from a reliable source separate from the third rail so that the lights would burn even if the shoes should be broken off or the fuses blown. Adoption of any of these features would have made the operation of the two types of cars in the same train an impossibility.

It was felt that the improvements which could be obtained were so great that they should be adopted and that the ideal of uniformity of equipment be abandoned. This left the engineers free to adopt whichever type of control seemed best. The requirements that the cars be provided with emergency lights and with tail and marker lights energized from a source independent from the third rail meant that each car be equipped with a storage battery of large capacity. The control could be supplied from the same battery without increasing its size so that storage battery control would actually be a step in the direction of simplicity.

Reasons for Using Battery Control

The Frankford cars run in a subway where practically all the dirt is brakeshoe dust. This is very finely ground and is highly conducting. It enters all parts of the equipment and the breakdowns in insulation appear mainly due to this cause. Trouble from this source would be practically eliminated by the substitution of 30-volt battery control instead of 600 volts from the third rail. Experience has shown also that when a failure occurs with 600 volts it is usually so serious as to require cutting out the entire cars. However, with 30 volts when a failure occurs it can be localized frequently to a single circuit.

One source of danger which not infrequently occurs from a failure of this sort is when the breakdown is on the first car of a train. When 600-volt control is used such a failure necessitates running the train from the second car. In a subway this not only is difficult but dangerous as well. As pointed out above, failure of insulation is very unlikely on a battery circuit, and even if it should occur on the 600-volt circuit of the first car battery control would permit cutting out the motors and operation of the remaining cars from the first. It is an interesting fact that in the Interborough subway in New York all cars originally had line control. However, 500 of them have been changed over to battery control and the last 1,000 bought also have battery control. It is said that the reason for the change is the freedom from insulation breakdowns. On the Brooklyn Rapid Transit line no subway cars are equipped with line control.

Strong as these arguments were, they took a secondary place when consideration was given to the electric coupler. The automatic electric coupler is essentially a detail of the equipment wherein trouble from high voltage may be anticipated. It consists of a number of energized knobs or buttons projecting from a plate. The necessity for compactness requires that these be placed very close to each other. In this case there would be thirty-three knobs, many of them placed not more than ½ in. from each other. If the voltage is only 30, a creeping surface of ¼ in. may be considered with equanimity. If, however, the voltage is 600, it cannot be so considered, especially if the surface is also apt to be damp and covered with iron dust. An electric coupler was desired. If an electric coupler was to be used, the control voltage used should be the lowest with which reliable operation of the control could be obtained. It is usually felt that this is about 30 volts, and this type of control was therefore selected.

To recapitulate: The existing cars were equipped with line control, and economy of operation would usually demand that the new cars be such as to permit operation in trains with the old ones. However, the determination to adopt safety features and details to reduce the cost of labor for operation made their use in trains impossible. Experience elsewhere made the adoption of battery control advisable and the decision to use the automatic electric coupler made this imperative.

Trial Locomotive for P.L.M. Railway

THE Paris-Lyons-Mediterranean Railway (Cie des Chemins de fer de Paris à Lyon et à la Méditerranée) has ordered from the Société Oerlikon and the Société de Construction des Batignolles a trial locomotive for its approaching electrification. This will be placed in high-speed passenger service.

The locomotive will develop 1,840 hp. continuously at 50 m.p.h. and 2,400 hp. for one hour at 30 m.p.h. In starting the tractive effort may reach 47,500 lb. The maximum speed will be 68 m.p.h.

Regeneration will be provided for, and a train of 300 tons trailing weight will be held to not more than 25 m.p.h. by this means when descending a 3 per cent grade.

Richmond Problems Being Analyzed

Experts Consider Rerouting, Valuation and Traffic in the City of Richmond, Va.—Find Considerable Jitney Service in Non-Competitive Districts

THE traffic check just completed on the car lines in Richmond, Va., by the Beeler organization should give information of value in the solution of the railway problem there. The Virginia Railway & Power Company operates the street railway lines in Richmond under a number of separate franchises granted at various times and having different dates of expiration. Practically all these franchises specify a rate of fare of 5 cents, with six tickets for 25 cents and special workmen's tickets at further reductions.

The company has requested the city to grant a thirty-year blanket franchise to replace the various franchises under which it is operating. It seems, however, that the city can grant franchises only after competitive bidding, and the city's legal advisers have held that bids can be called for only after the company has surrendered its franchises or they have expired. As the company might be unsuccessful in bidding on the new franchise, it has been unwilling to surrender its present grants.

During the past several years the Richmond railway division of the company has been unable to cover operating expenses at the specified rates of fare, so the city suspended these rates and the company has been operating under a temporary rate of 6 cents granted by the City Council. The city government, in granting this relief, felt that definite action should be taken to provide a more stable basis of operation for the company. It was claimed that the division of expenses between the various physical and political divisions of the company was not being made correctly. The company produced a valuation which it presented as a basis for negotiations, requesting a fare to yield 8 per cent on the cost of reproduction as of Jan. 1, 1920. The city was opposed to acceptance of this valuation as it stood. In addition the city felt that the entire situation required an analysis.

To complicate matters still further, a strike of the trainmen last winter to combat a wage cut caused the growth of a competing jitney service. There was a partial boycott of the street cars by union sympathizers. The company fought the strike to a finish and is now operating with practically new forces. The business is now coming back. To curb the unfair jitney competition the city passed an ordinance restricting jitney operation to five definite routes which in general do not directly cover street car lines although they operate in street car territory. The jitney fare was fixed at 8 cents. Provisions for adequate bonding and insurance were included so that irresponsible jitney men would be forced out of business. The jitney operators contested this legislation and obtained a restraining injunction which was later dissolved, so that the city ordinance is now in effect. It has resulted in a reduction in the number of jitneys from about 500 to 100. Practically all the jitneys now in service are running on what is known as Route No. 1, which serves a high-class residence territory in which the car lines are a considerable distance apart. The railway for some time had an application before the Council to construct a car line in this territory, but met with much opposition from the property owners, so that the project was abandoned. In lieu of a car line the company has been willing to install a trackless trolley and operate it as a part of the street car system, at the same fare and with free transfers. The property owners have objected to this project also on the ground that the overhead wires would be a disfigurement.

In July of this year a bus line was granted a franchise to operate at an 8-cent fare over what is practically the same as jitney route No. 1, in the territory where the company was refused a permit for a trackless trolley. While the franchise has been passed by the Council and approved, it still remains open until bids are obtained and the franchise awarded to the successful bidder. Meanwhile the jitneys are doing a considerable business in this district. Manifestly a situation such as this is exceedingly unsatisfactory and should not be allowed to continue.

To have the full information before it to make a proper decision, the City Council, through Ordway Puller, chairman of the committee on streets, has engaged the Beeler organization to make a thorough investigation of the entire situation and advise with regard to the valuation, the efficiency of operation, the company's accounting methods and the car routing and service furnished in Richmond.

The valuation is being reviewed carefully to see if it is applicable to the present situation. This involves a check of the inventory and prices adopted, as well as an analysis of the theory on which the valuation was prepared. An audit of the books and records of the company is being made to determine their accuracy and also to find if the allocation of items between the railway and light and power departments, as well as between the geographical divisions, has been made properly.

Since it is probable that the routing, which was laid out a generation ago and has not been changed materially since, is not now adequate, a special study is being made to see if improvements can be introduced which will at the same time result in more efficient and economical operation. The service is being checked, since there appear to be inequalities that should be adjusted. The operating methods of the company are also being investigated. It appears probable that with a rerouting and the installation of modern methods the revenues of the railway can be increased and the operating expenses reduced. This should make it possible to earn a reasonable rate on a fair valuation, which is the result desired by both the city and the company.

A.B.C. of Commission Work

A LEAFLET on the methods of the Department of Public Works in Washington State, written in simple language, has been prepared by E. V. Kuykendall, director. It is entitled "Explanation of the Operation of the Washington Department of Public Works, Formerly the Public Serrvice Commission of Washington." It explains why the department was created, how rates are fixed, why inventory and valuation are made, how and why hearings are conducted, and other matters which might suggest themselves to one interested in knowing the practice of the commission. Under the heading "Our Responsibility" the pamphlet concludes as follows:

> The latent resources of our state are immeasurable. Our undeveloped water power vastly exceeds that of any other state in the Union. Our irrigable acreage will in future years support teeming populations. Capital is slow to put

investment in enterprises of low earning possibilities. Public utilities are the instrumentalities through which power must be developed and distributed for the reclamation of arid wastes and the operation of factories and industries soon to come. By a rash exercise of power we could drive utility investors from our state. We have sought in the performance of our duties to take a comprehensive view of our field of operation with forward vision. We who are charged with the responsibility of regulation must pursue the path of justice to the public and the utilities alike. Any other policy would not only violate our fundamental law but would also work untold injury to the progress and welfare of our state.

Track Grinder Warning

San Francisco Company Also Instructs all Employees in Accident Prevention—Other Safety Activities Carried On by the Company

THE Market Street Railway of San Francisco in its accident prevention work has adopted a plan of giving illustrated lectures to all newly employed trainmen who have been thirty days in the service. This policy has been established on the theory that the

TRACK GRINDERS IN SAN FRANCISCO AT NIGHT CARRY AN ILLUMINATED DANGER SIGN WITH RED LETTERS

recently employed trainman is better able to understand, after thirty days in the service, the importance of conforming to the rules and regulations of the company, and these additional instructions impress him in the event that he thinks that he has mastered the duties of his position. Older employees who have shown a tendency to be neglectful or careless in their work are sent to these lectures, given by the claim agent.

Previous to attending the safety lectures, student trainmen are furnished with a booklet in which are graphically shown various types of accidents.

Safety bulletins and cartoons are posted on the bulletin boards in all carhouses; articles on "safety always" are published in the employees' monthly magazine, and every effort is made to keep the men enthused in their accident prevention work by displaying on the bulletin boards the monthly records of each carhouse compared with other carhouses on a car-hour, car-mile and passengers carried basis.

While the company does not maintain a safety committee among its employees, each employee is taught to consider himself a safety committeee member of one, and he is urged to present suggestions which if placed in effect might reduce accidents. At all times employees of the company are confronted by the company slogan, which is "Care; Comfort; Courtesy."

Accidents are investigated by the claims department regardless of whether claims are filed, so that all available information will be in the hands of the operating department when it endeavors to determine the question of responsibility.

The co-operation of the public is sought in accident prevention by utilizing the windows of the cars and backs of transfers for printed matter. Illustrated lectures under the auspices of the company are given to school children, for it is realized that they are the safety missionaries in the home, and the claim agent instructs boy scouts on how to assist in safety work.

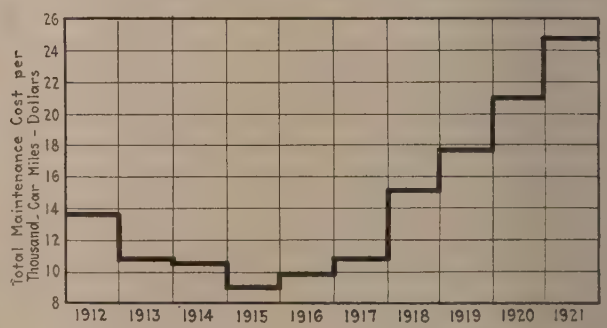
Almost twenty-five thousand illustrated booklets, titled "For Humanity's Sake; An Appeal to Automobilists for Safety," have been distributed to automobile owners throughout the city, and accident prevention placards published by the company and circulated under the name of the San Francisco Safety League have been placed in garages and stables.

The accompanying engraving shows an illuminated danger sign recently devised which is now being placed at night on track grinders, welding machines and concrete cutters when they are standing on the street. The sign is lighted by ten red incandescent lamps and the lettering is 6 in. high, making the word "Danger" visible for a considerable distance.

Maintenance Figures in Memphis

IN THE series of sixteen charts giving ten-year records of Memphis maintenance statistics, published on page 262 of the issue of this paper for Aug. 19, there is an error in the position of the decimal point in the chart showing total maintenance cost on a car-mile basis. This chart, in lower right-hand corner of the former group, has been corrected and is reproduced.

There was also an error in the figures on renewal and reserve expenditures in the large table on page 264



MAINTENANCE COST FOR TEN YEARS IN MEMPHIS

of the same issue. The figures given in the article were for all departments. The corrected figures on the mechanical expenditures, together with the renewal and replacement reserve and total balance reserve, which were given correctly in the table, are published below:

	Month of December		Year to Date	
	1921	1920	1921	1920
R. & R. expenditures (mechanical department only)	None	None	$22,806.86	$10,938.51
R. & R. reserve (all departments)	$7,841.66	$3,263.00	45,634.35	51,950.50
R. & R. total balance reserve (all departments)	.....	.....	234,049.54	179,923.06

Equipment and Its Maintenance

Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments

Solving a Difficult Situation in Pole Setting

CONSIDERABLE difficulty was experienced in spanning Edinburgh's north bridge with overhead wires for electric operation. A specially cast base for anchoring the poles stretches across a brick arch of the bridge carrying the entire weight on two steel girders at the end of the casting. The accompanying illustration shows one of these bases in position on top of the arch ready for concreting in. A very substantial construction is thus provided.

Gasoline Rail Car Operating Cost

THE Alabama, Tennessee & Northern Railroad, Mobile, Ala., is operating one gasoline rail car between New York and Silas. The one-way distance is 53.5 miles and the car makes one round trip each day, or a total daily mileage of 107. A scheduled speed of 25 m.p.h. is satisfactorily maintained, according to a statement by J. T. Cochrane, president, who also remarks that the car is pleasant to ride in and quite popular with the patrons of the railroad as there is very little vibration or noise. It will start easily on any grade on the line and it gets away as quickly as an automobile without undue noise, jerking or other discomfort.

By accurate records kept during the thirty-one days of May the car was operated 3,317 miles, an average of 107 miles per day. The gasoline consumption was 390 gal., costing $95.18, and the oil consumption 13 gal., costing $4.94. This is a cost for gasoline and oil of slightly over 3 cents a mile. Mr. Cochrane figures "that the maximum cost of handling this car, including wages, cleaning, etc., will not exceed 15 cents per mile."

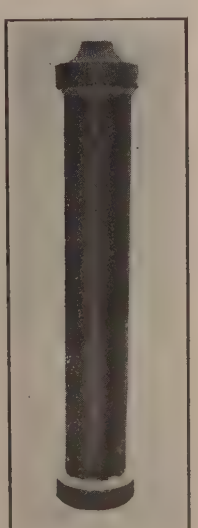
The car used was manufactured by the Indiana Truck Corporation, Marion, Ind. The body is arranged for pay-as-you-enter one-man operation and seats twenty-nine passengers. A toilet has been provided just back of the driver's seat. The chassis is mounted on a double truck at the front with single-drive wheels at the rear. The transmission includes four speeds forward and four speeds reverse. Brakes are provided on all wheels, the rear brakes being of the band type, while those on the front wheels brake directly on the wheels.

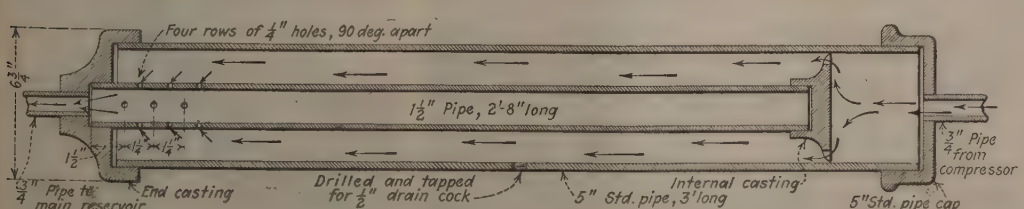
Air Cooler Made from Standard 5-in. Pipe

THE cars of the Cleveland Railway are being equipped with air coolers made from a 36-in. section of standard 5-in. pipe. Its purpose, of course, is to be inserted in the air line between the compressor and the main reservoir to cool the air sufficiently in passage so that all excess moisture will be dropped. The warm air, on being received from the compressor, enters the cooler and is deflected by a baffle so that it follows along in the space between the wall of the 5-in. pipe and another internal 1½-in. pipe concentric with it. In this way the air is kept in contact with the larger pipe where the cooling effect is obtained. The air leaves through twelve ¼-in. holes placed in the opposite end of the inner pipe. Accumulated moisture is drawn out of the outer pipe through a drain cock in the bottom of the cooler.

The only special castings required are the internal baffle and the cap on the reservoir end of the cooler. Both of these parts are threaded to receive the inner 1½-in. pipe. The simplicity and ruggedness of this device can be seen in the accompanying photograph, while the line drawing gives the details of construction and shows the path of the air as it passes first through outer portion and then leaves by the center pipe.

Terrence Scullin, master mechanic of the Cleveland Railway, is making the installation.





AIR COOLER MADE FROM STANDARD 5-IN. PIPE

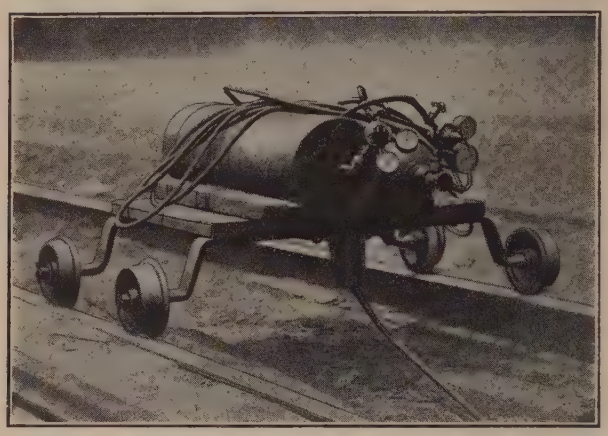
The line cut shows the details of construction of the air cooler. End castings and an internal baffle are the only special parts necessary.

The halftone illustration shows the air cooler, made from 5-in. wrought-iron pipe, which is being installed on the cars of the Cleveland Railway.

Truck for Oxyacetylene Tanks

IN CONNECTION with its track reconstruction this year the Brooklyn Rapid Transit Company has made considerable use of oxyacetylene torches for cutting the ends of the rails or burning the nuts off the bolts in the plates.

The accompanying illustration shows the manner of mounting the gas tanks on a small home-made truck so



GAS TANKS MOUNTED ON TRUCK

that they can be easily moved around on the job by the same man who does the burning with the torch. It will be seen that the truck is equipped with a "T"-shaped handle so that the man can pull it after him when he goes from one rail joint to the next. When it is desired to move the equipment from one job to another it is carried either on a heavy motor truck or in a car.

Pressing Wheels Off Without Disturbing Gears

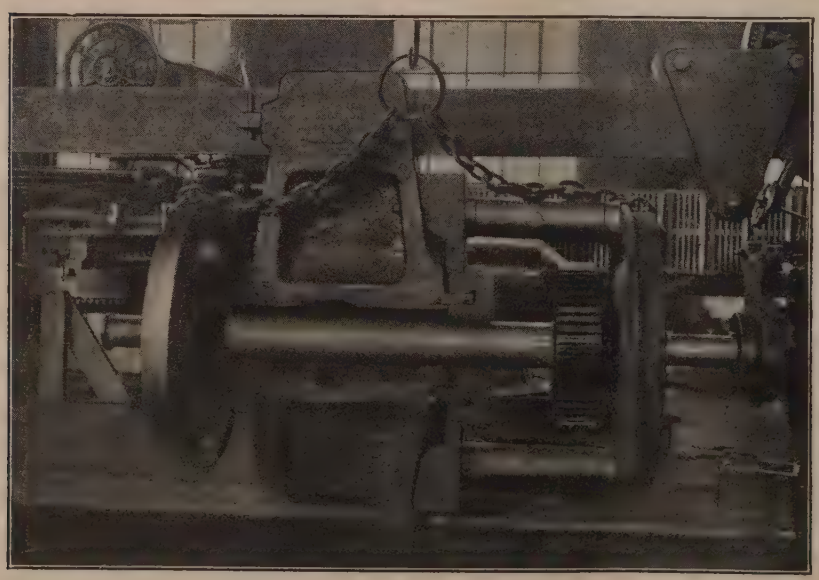
THE attachment of two cast-iron blocks to the traveling head of the wheel press in the shops of the Northern Ohio Traction & Light Company has made possible the removing of wheels from the gear end of an axle without disturbing the gear. These blocks act as seats for the two cylindrical spacing blocks that bear against the wheel rim. By mounting the spacing blocks on arms and hinging them to a post bolted to the back of the traveling head, they can be easily swung and held into position. They are also adjustable for different wheel diameters. Demounting the wheel adjacent to the gear on a wheel press equipped with these home-made devices makes the process little different from pressing off the one on the opposite end of the axle.

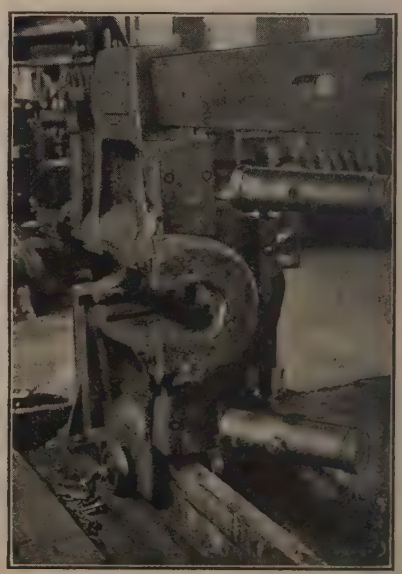
New Type Trailers for Toronto

AS ANNOUNCED in the Rolling Stock columns of this paper in the issue for Aug. 19, 1922, the Toronto Transportation Commission has placed an order with the Canadian Car & Foundry Company., Ltd., for 100 trailers and fifty motor cars of the Peter Witt type. Some additional details regarding the construction of these cars are now available.

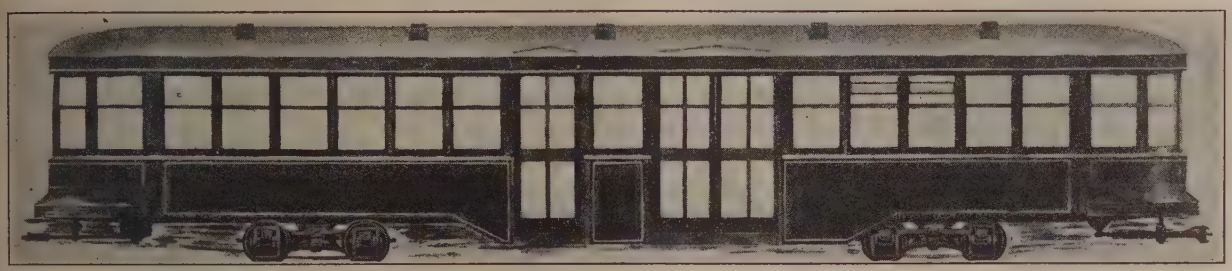
An accompanying illustration shows the design of trail car adopted. This is approximately 49 ft. over bumpers and differs from the trailers already in service in Toronto in the arrangement of the door openings. The new trailers have three doors near the center, one pair forming a double opening to the right, with the single door opening at the left. The door at the left is always used as an exit door and the door at the extreme right always as an entrance door, but the center door may be used either as an exit or entrance as traffic conditions warrant.

Inside the car at the center door is a movable barrier. When the conductor wishes to have the door used as an exit, the barrier is swung at right angles to the center of the car. The passengers in the forward part of the trailer can then file past the conductor, pay their fares and secure transfers as they leave without interfering with the unloading of passengers in the rear of the car who have previously passed the conductor on their way to the seats at the rear. When the barrier is swung along the center line of the trailer, the door can be used as an entrance to load the front of the car.





AT LEFT, TRAVELING HEAD OF PRESS FITTED FOR DEMOUNTING WHEEL WITHOUT PRESSING OFF GEAR. AT RIGHT, THE HINGED SPACING BLOCKS CAN BE EASILY BROUGHT INTO USE



NEW TYPE TRAILER FOR TORONTO

This arrangement of openings was devised by G. W. Harvey, assistant general manager, to assist in quick loading and unloading at heavy traffic centers. When the car is operating in a district where the majority of passengers are boarding, the center door will be used as an entrance, and when the trailer enters an area in which the majority of passengers will alight, the conditions are reversed. The conductor's station is at the center of the car between the center and left-hand door.

The fifty motor cars, which are also being built by the Canadian Car & Foundry Company, Ltd., are of the Peter Witt type, but have some special features. They are smaller than the cars now in operation in Toronto, being but 47 ft. long as compared with 52 ft. for the present cars. The motor equipment will be of less capacity and they will not be used for hauling trailers as are the present cars. Provision is made so that the cars can be operated either as one- or two-man cars. The front vestibule is divided by curved barriers, so that the cars can be converted into one-man pay-as-you-enter, or one-man pay-as-you-leave as desired. Normally, they are intended to have the conductor placed in the center of the car.

Graphical Record of Tower Wagon Trips

THE accompanying illustration shows a record of the number of calls, the time taken to reach the point of trouble and the time consumed for making repairs taken on an emergency tower wagon used by the city of

GRAPHICAL RECORD OF OPERATION OF EMERGENCY TOWER WAGON

Detroit, Department of Street Railways. The record is made on a meter manufactured by the Service Recorder Company, Cleveland, Ohio.

The mechanism consists of a clock driving a record on which a small marker makes an impression when the tower wagon is in operation. No ink is used, or rather the ink is "built in" to the record form. The meter pendulum which records the operation is extremely sensitive and the record is made by the rocking of the tower wagon while it is in operation. The meter can be mounted in any convenient location and can be padlocked so that the record cannot be tampered with. After each day's run records are removed for inspection and tabulation of data. The idea of using this method to form a graphical record of the operation of emergency tower wagons was originated by E. M. Gould, electrical engineer for the city of Detroit, Department of Street Railways.

Salt Mine Waste Used for Track Ballast

SOME TIME ago the Cary Salt Company of Hutchinson, Kan., donated a large quantity of waste product to the Hutchinson Interurban Railway to use as it saw fit. To make use of this material, the railway

RAILWAY MOTOR USED TO OPERATE STONE CRUSHER

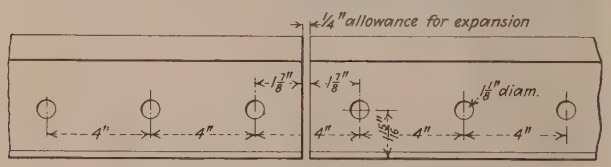
equipped an old stone crusher with a Westinghouse 323-A railway motor, together with the controller and necessary grid resistors. Through the use of this crusher the waste product was transformed into 2,000 cu.yd. of ballast at approximately 90 cents per cubic yard. The ballast was used to pave the company's right-of-way. The original crusher had a normal capacity of 2 cu.yd. per hour at 450 revolutions. Through the use of the railway motor, the speed was increased to 1,000 revolutions and the capacity of the crusher to 5 cu.yd.

The current for operating the crusher was obtained from the trolley wire and the circuit was completed through a wire attached to an old brakeshoe which gave contact with the rails. The crusher was moved from one place to another by means of a cable which was hooked to one of the regular service cars of the company.

British Adopt Curved Head Rails

THE British Engineering Standards Association (formerly the Engineering Standards Committee) has recently issued its report No. 2, 1922, covering British standard specifications and sections for tramway rails and fishplates, revised March, 1922. Perhaps the most interesting feature of this report is in the adoption of the curved head (convex tread contour) for these rails. It will be seen from the illustrations that the head is formed by the curve of 9-in. radius which is connected to the gage side of the head by a fillet of $\frac{5}{16}$-in. radius. This head curve radius is sharper than that used on either the American or Australian sections. The tapered web, similar to that of the American sections, is used in two of the new sections, but a straight web, $\frac{5}{8}$ in. thick, is adopted for the heavy 7-in. section, and it will be noted that the 112.9-lb. section has a base 7 in. wide while the 103.7-lb. section has a base $6\frac{3}{4}$ in. wide. All told, there are now only four standard sections of varying weights with their accompanying guard rails, making a total of eight standard rails for tramways.

The angle of the gage side of the head is set at 7 deg. instead of the 5 deg. found in the American standard sections. The width of the head is the same for all sections, viz., $2\frac{1}{8}$ in., which is practically a continuation of the British practice in adhering to comparatively narrow rail heads and wheel treads, in contrast to American practice, which tends towards wide rail heads and wheel treads.



STANDARD DRILLING FOR BRITISH STANDARD GIRDER RAILS

QUALITY AND CHEMICAL COMPOSITION OF THE STEEL

	Bessemer Process Acid Per Cent	Bessemer Process Basic Per Cent	Open-Hearth Process Acid Per Cent	Open-Hearth Process Basic Per Cent
Carbon	0.50 to 0.60	0.45 to 0.55	0.60 to 0.70	0.60 to 0.70
Manganese, maximum	1.0	1.0	1.0	1.0
Silicon, maximum	0.10	0.30	0.10	0.30
Phosphorus, maximum	0.075	0.08	0.06	0.06
Sulphur, maximum	0.07	0.07	0.06	0.06

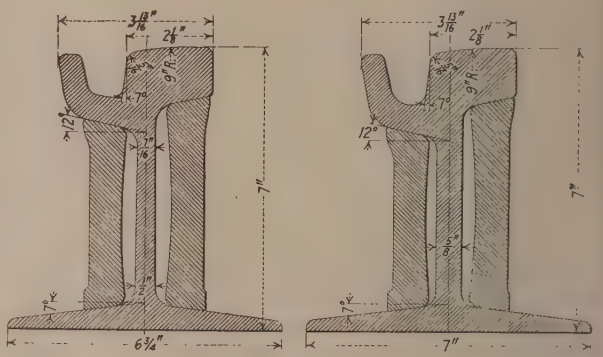
It will also be noted from the accompanying table, showing the chemical compositions specified, that the British specifications do not provide for as high carbon as do the American specifications, but for the basic open-hearth process, silicon is increased to 0.30 while American specifications call for a maximum of 0.20 and for both the bessemer and open-hearth processes. Manganese is permitted to a maximum of 1 per cent.

The British specifications provide a tensile test on a standard test piece to be cut from the rail head. The test must show a tensile breaking strength of not less than 45 tons per square inch with an elongation of not less than 10 per cent. This test is in addition to the usual falling weight (drop) test. Such a tensile test is not usually a part of any American rail specifications. There is no mention of the impression test which is being substituted for the drop test in our girder rail specifications by the A.S.T.M. and A.E.R.E.A.

The standard rail drilling adopted is shown in the accompanying illustration. It will be noted that this allows an opening of $\frac{1}{4}$ in. while it is customary in American practice to make no allowance for drilling for rails to be used in streets. The drilling indicated is 2 in., 4 in., 4 in., while American practice is generally standardized on $2\frac{1}{2}$ in., 4 in., 4 in.

Rails which are intended for use with welded joints are to be undercut not more than $\frac{1}{16}$ in.

The new British standard fishplates (splice bars) present some interesting features, which are in contrast to American practice. The fishing angles in particular are of note, the angles of the top of the plate being 12 deg. and that of the bottom being 7 deg., while the angle for American standard splice bars for girder rails is held at 9 deg. for both top and bottom.



LEFT, BRITISH STANDARD RAIL SECTION NO. 7, 103.7 LB. PER YARD. RIGHT, B. S. SECTION NO. 8, 112.9 LB. PER YARD

Another feature is the use of $1\frac{1}{8}$ in. square holes in the outside or wide bars in contrast to the American practice of using oval or elliptical holes in one set of bars. Both designs are, of course, for the purpose of preventing the turning of the bolt during the tightening process. There are practically no square holes used in this country in splice bars on electric railways and probably the only ones used on steam railroads are found in the standards of the New York Central Railroad and its allied lines.

Making a Sleet Cutter Out of a Worn-Out Trolley Wheel

TROLLEY WHEEL ARRANGED FOR SLEET CUTTING

THE accompanying illustration shows a 6-in. trolley wheel which has layers of copper added to the groove so as to form a rough surface and to serve as a sleet cutter. Wheels arranged in this manner are used by the New York State Railways and have been found very satisfactory. During a sleet storm the regular type of sleet cutter used by the railway was exhausted, and these wheels were made up for emergency. They have worked so satisfactorily, however, that the railway is continuing a supply of them for future use. One advantage from the use of these wheels is that when they are placed in the

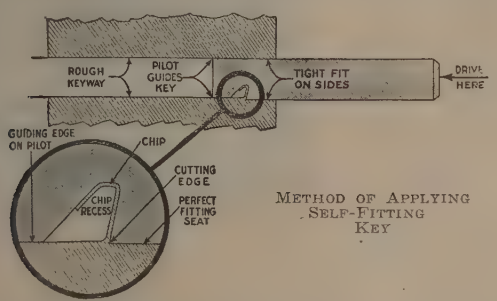
cars during a sleet storm they do not need to be removed as soon as the sleet has disappeared, as they soon wear smooth and can be continued in service, while with sleet cutters it is necessary to have a gang of men remove them as soon as the sleet has been cleared.

What's New from the Manufacturers

Self-Fitting Keys

KEYS are used to make the driving connection between shafts, axles, gears, sprockets, pulleys, etc. It is usual to mill or slot the keyway in the shaft and to slot the keyway in the external member. But both of these keyway sizes will vary slightly and to obtain the desired tightness between the key and keyways it is necessary carefully to fit the parts together. This has usually been done by hand, either by filing the key to fit the keyways or by filing or scraping the keyways to fit the key.

It usually takes a good mechanic three or four hours to fit an ordinary 1½-in. x 1½-in. key. A key slightly smaller, say 1 in. x 1 in., may require only two hours and in exceptional cases may be fitted well enough in an hour. But the mechanic needs to be experienced and the key and keyways need to be almost the right size to start with in order to obtain these results. Such hand



METHOD OF APPLYING SELF-FITTING KEY

fitting generally is quite expensive work and the results are not always satisfactory.

To meet this condition, Smith & Serrell, Newark, N. J., have placed a new "Keytite" self-fitting key on the market. A tough chisel stock is used and this is ground to a size very slightly larger than the nominal keyway width. A cutting edge and chip recess are provided near the front end of the key. Ahead of these is a pilot slightly smaller in dimensions than the nominal keyway width.

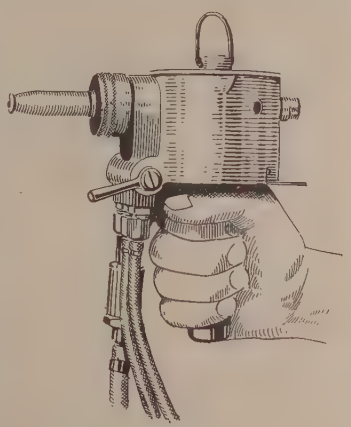
To install one of these keys the pilot is entered first with the cutting edge at the side. Then the key is driven home with an ordinary machinist's hammer or with a sledge, depending upon the size of the key. The cutting edge sizes the keyways to make a tight fit between the body of the key and the keyways.

In the larger sizes cutting edges are sometimes provided on both sides. When it is desired to fit top and bottom as well as on the sides, a cutting edge is also provided at the top. Gib keys and other modifications can be furnished as required, all with this self-fitting advantage.

Protective Coating by Metal Spraying

A Method of Applying Zinc or Lead Coating to Bridges, Railway Structures or Cars Has Been Perfected as a Means of Protecting Equipment Exposed to the Action of the Elements

A PROCESS of applying a coating to any metal parts as a protection has been perfected by the Metals Coating Company of America, Philadelphia, Pa., and is known as the Schoop metal spraying process. In this process the coating metal adheres to the object simply by mechanical union. The metal is discharged in hot impalpable particles moving with high velocity, and these when directed upon a prepared object penetrate the pores while the spray is still plastic. At present the principal use of the metal spraying process is for galvanizing. About two years ago the Swiss government adopted this method for protecting the transmission towers and girders on the electrified section of the St. Gotthard Railway. In addition to this certain railway bridges were galvanized and the underbodies of rolling stock were coated with a zinc coating.



FORM OF SPRAYING PISTOL USED

The operating principle of the process is briefly that metal wire or dust is first melted by an oxyacetylene flame and then the molten metal is blown by a compressed air jet in the form of spray against the surface to be coated. Three methods of applying the process have been perfected, each possessing particular features in its field of application. These consist of the "pistol" form which uses metal wire of standard commercial gages which is fused with gas; the powdered metal equipment, using powdered metal, as the name implies, and the electro-pistol. The wire spray process is the most extensively employed.

The principle of the spraying pistol is illustrated in an accompanying diagram. A fine wire of any metal is fed into a reducing flame zone at such a constant speed that the position of the end of the wire remains

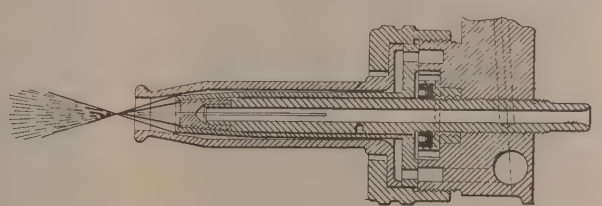


DIAGRAM SHOWING APPLICATION OF REDUCING FLAME TO METAL WIRE IN THE PISTOL

stationary, the melting rate being exactly equal to the rate of feed. As the end of the wire melts, each drop is struck a violent blow by an air blast. A fog or spray of fine metallic particles results and these pass through a diverging cone with a core of reducing gas. The spray thus forms a metal coating air brush, the diameter of which 5 in. from the pistol end is about 2 in. Objects

to be sprayed with metal are operated upon by pointing the pistol normally at the surface to be coated at about 5 in. distance and by directing the pistol across the surface with a regular motion. A single coating is about 0.001 in. thick.

The pistol operates on an air pressure of 50 lb. and commercial oxygen and acetylene gases secured in tanks under pressure are used. A standard oxygen gage and an acetylene regulating gage are used for adjusting the proper proportions of each gas to secure the temperature required for melting the different metals. The pistol connections are attached to these gages with a set of valves.

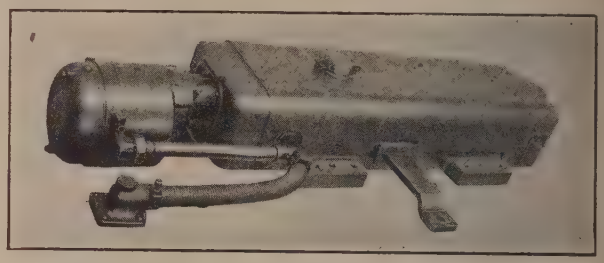
Portable Measuring Instruments

THE Westinghouse Electric & Manufacturing Company has added a new type of ammeter and voltmeter to its line of portable instruments. The instruments are designated as type PX-3. The movements of these instruments are light in weight and are mounted on a micarta sub-base which can be removed as a unit. The cases are made of molded composition which is strong and acid-resisting. A round open-faced dial gives good illumination on the scale. All instruments have external zero adjusters.

Remote Control of Outlying Switches for High-Speed Railways

TO MEET the need of electric railways for apparatus to operate remote switches, the General Railway Signal Company, Rochester, N. Y., has developed an alternating-current switch machine and means for its control. The switch machine is a compact unit, made long, narrow and low so as not to interfere with the clearances of any electric railway. It is supported on two tie timbers and is easily installed. The machine may be furnished with a motor to operate on 110 volts, 25 cycles, or 110 volts, 60 cycles, or a direct-current motor can be provided if required where alternating current is not available.

The desk-type circuit controller is a recent development which simplifies the remote control of an outlying switch layout. It is a small, complete unit measuring 12½ in. high by 6¼ in. wide by 12 in. deep and comprises a controller with ten contacts, an electric lock and four indicators. In other words, the unit contains all of the apparatus necessary in the control station to control remotely a single switch and the signals which govern over it. When it is desired to control a layout consisting of more than one switch two or more circuit

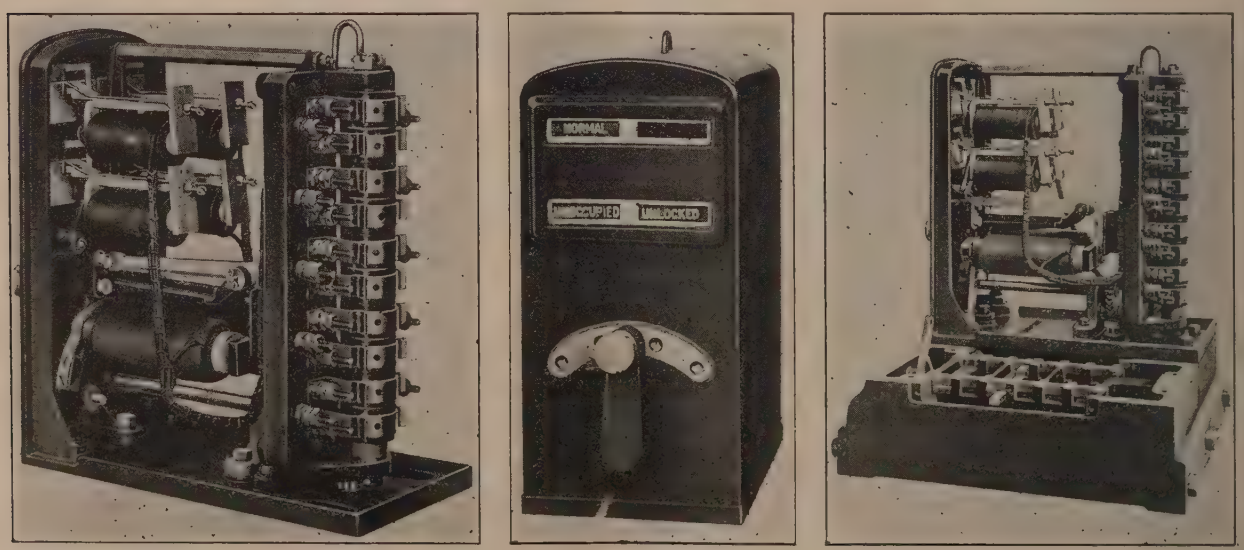


SWITCH MACHINE

controller units may be used, and if it is necessary to interlock these units a sub-base 4 in. high is furnished with each unit. The bases are bolted together and serve as a locking bed.

The unit construction of the circuit controller makes it adaptable to almost any conceivable switch layout that could be remotely controlled. It may be furnished fully equipped or parts may be omitted when not required. The signals used to control train movements over a remotely operated switch layout may be of the semaphore or color light type—as desired. Practically no expense is added to the operation and maintenance of remotely controlled switch layouts if they are installed on track already equipped with automatic block signals and if they can be operated by a station attendant who has other duties.

FOUR-UNIT INTERLOCKED CIRCUIT CONTROLLER



DESK CONTROL PARTS

The Financial Side of Accident Prevention*

Expenditures on Account of Accidents and Insurance Against Accidents Are the Only Non-Productive Items of Electric Railway Operating Costs—Their Increase in per Cent of Gross Earnings Is Alarming

By GARRETT T. SEELY
Vice-President and General Manager Pennsylvania-Ohio Electric Company, Youngstown, Ohio

FURTHERANCE of the cause of accident prevention primarily is to be considered from the humanitarian viewpoint. Efforts to reduce to a minimum accidents in industry, on the highways and in the homes are efforts directed toward the prevention of the deaths or suffering of individuals. That is the basis on which the movement for accident prevention started; that is the basis upon which we must continue to build.

The humane aspect of the work is the prime essential. Death and suffering in themselves cannot be measured in monetary units, but there is a corollary to deaths and injuries and accidents as a whole that must be measured in dollars and cents. This is the economic loss caused by the interruption to the usual occupations of those injured, the loss to industry through the deaths of workers, the utter waste of property needlessly destroyed.

This economic loss cannot be measured with exactness, but it mounts into staggering sums of hundreds of millions of dollars each year. Payments for loss and damage to property and injuries to persons by the steam railroads of the United States in the year 1920 alone amounted to $199,591,261; the total annual accident cost in all lines of industry and business has been estimated at $1,500,000,000. It is an economic loss to the entire people, and part or all of it must be paid for through the companies experiencing the accidents that cause the loss.

COST OF ACCIDENTS TO PUBLIC UTILITIES

A somewhat detailed consideration of these dollars-and-cents losses, of this financial side of the accident-prevention work, then, is fitting. For the purpose of this discussion the cost of accidents to public utilities alone will be considered, adequate figures to include the whole field of industry not being available.

Every cent spent by public utilities for operating expenses, taxes and interest is devoted to something productive, with the exception only of those sums expended for accidents and insurance. The money spent for maintenance restores the physical property to normal condition, providing new tracks, equipment, poles, ties, wires, insulators and the like; the money expended to produce gas or power yields something that is salable; the sums disbursed in wages produce that which is salable, or do some constructive work; the taxes paid, inequitable and burdensome though the portion placed upon utilities may be, secure fire, police and governmental protection. Interest and dividends paid make it possible to obtain new capital for improvements and extensions; but the money expended because of accidents cannot in any way be considered as productive. It is a severe drain on the earnings of the industry—it is irretrievable waste.

Little published information is available as to the actual cost of accidents of all classes, including legal and claim department expense chargeable thereto. The United States Census Bureau's report on electric railways gives the cost of accidents for 1917, but no figures for earlier or later years were obtainable. An excellent and complete report on the cost of accidents on the steam railroads from 1897 to 1920, inclusive, is contained in a publication entitled "Railway Statistics of the United States of America for the Year Ended 1920," prepared by Slason Thompson, Bureau of Railway News and Statistics, Chicago. The information bearing on our subject which has been obtained from these two sources will be given in detail later.

GOVERNMENT REPORTS NOT COMPLETE

There are no government reports or compilations prepared by national associations available to show the accident costs of water companies, telephone and telegraph companies, gas companies, electric light and power companies, interurban railway companies or city street railway companies.

Therefore, to secure sufficiently comprehensive data on the accident costs of the various utilities, several hundred letters were sent to representative companies in all parts of the United States. These letters asked for the total cost of accidents and damages, including expenses of claim and legal departments, and the gross earnings of each of the companies for the last five years. The generous response to these hundreds of questionnaires made possible a study of the subject that may be accepted as truly representative of the utilities of the country as a whole.

In the study made of the statistics obtained, the averages for the last five years were taken rather than the figures for one year, as it was felt that such averages would reflect more accurately the conditions that actually obtain. A careful effort also was made to segregate the earnings and accident costs of companies operating more than one class of utility, so that the grouped figures for each classification would be representative.

The gross earnings of all utility companies increased at an abnormal rate during this five-year period, due largely to rate increases. The cost of settling accident claims also increased greatly, because of the lessened value of the dollar.

The amount of money and the percentage of gross earnings expended because of accidents vary widely with the different classes of utilities. They vary almost in direct proportion with the degree of contact on the part of the public with the commodity sold or the equipment used in rendering service while such commodity or equipment is under direct control of the utility. They also vary in proportion to the extent that the business of the utility is conducted on or across public streets or highways.

As is to be expected, the water companies and the telephone and telegraph companies have the smallest number of accidents, both to the public and their employees, and the lowest costs in proportion to earnings of all utilities. There is nothing hazardous in itself about the commodity they have for sale or the means of rendering service. Their mains and pipes and wires and equipment in general are well removed from normal contact with the public.

To a somewhat lesser degree this also is true of the gas companies. Their commodity does present some hazards of fire, explosion and asphyxiation, but their pipes or conductors, or the vehicles transporting the commodity, are entirely underground or built in walls and floors of buildings or firmly attached to permanent structures.

The point of delivery of their commodity usually is at the entrance of a building, where practically all responsibility of the utility ends. The utilization of the commodity is in the hands of the consumer, and service is affected only to a minor degree by weather conditions and not at all by traffic on the streets or by any such public interference.

Electric light and power companies are next in low costs of accidents. They render no service openly on the public streets and the commodity furnished is carried either in underground conduits or in insulated wires high enough above the streets to be away from the public. Poles, wires and insulators may fall and storms may create undue stresses, but the public, under normal conditions, does not come into direct contact with the vehicle carrying the commodity.

MEASURE OF RESPONSIBILITY IMPORTANT FACTOR

Transportation companies are engaged in a business that is most hazardous to the public and to employees. Generally speaking, the business is the carriage of human beings or material articles and the company is responsible for their security from the time the persons present themselves or the articles are turned over to it until delivery at their destinations.

Steam railoads are almost entirely on private right-of-way and grade crossings in congested city and rural districts are rapidly being eliminated. Col-

*Abstract of paper presented at eleventh annual convention of National Safety Council, Detroit, Aug. 28-Sept. 1, 1922.

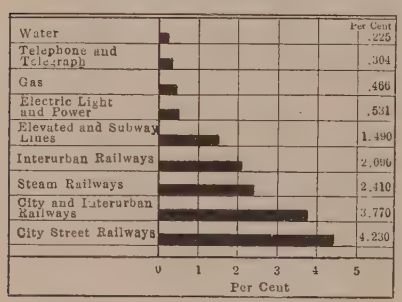
lisions and derailments are the most general sources of accidents. Elevated or subway electric lines carry passengers only, but operate their cars either above the street level on isolated structures or below the street level and their type of construction is such as are likely to reduce accidents to the minimum.

Surface electric lines have the most intimate contact with the general public and, accordingly, they have the greatest accident cost. Their business is chiefly the carriage of human beings and these are carried in light cars in the midst of dense traffic, the cars threading their way among pedestrians and rapidly propelled vehicles, which are under the control, many times, of irresponsible individuals.

With these varying conditions in mind, let us turn to the consideration of some of the actual costs that the various utilities have had to meet and see in dollars and cents how important is the "Financial Side of Accident Prevention."

Steadily Rising Percentage of Gross Receipts

As has been stated, a complete compilation of the cost of accidents on steam railroads was obtained from the 1920 issue of "Railway Statistics of the



ACCIDENT COSTS OF PUBLIC UTILITIES EXPRESSED IN PERCENTAGE OF GROSS EARNINGS

United States of America." Table I shows payments on account of loss and damage and injuries to persons, the gross earnings and the proportion of each of the above items to gross earnings for each fifth year from 1900 to 1915 and for each year from 1916 to 1920, inclusive. The loss and damage items include payments on account of loss and damage to freight, baggage, property and livestock. The injuries to persons include costs of accidents to employees, passengers and the general public.

It will be noted that in 1900 the cost of loss and damage to property was less than the cost of injuries and damages to persons.

In 1915, the gross earnings had increased practically 100 per cent, while the loss and damage had increased more than 400 per cent, and injuries to persons had increased more than 200 per cent. The combined cost increased $65,037,690, or more than 300 per cent, while the percentage of gross earnings thus paid out increased from 1.04 per cent in 1900 to 2.20 per cent in 1915.

In 1916, 1917 and 1918 there was very little change in the percentage of gross earnings required to meet these costs, despite the fact that the gross earnings increased greatly.

In 1920, while the gross earnings increased to more than $6,300,000,000, the loss and damage costs had risen to 2.26 per cent of the gross earnings, and the cost of injuries to persons had increased to 0.91 per cent, making the combined cost $199,591,261, or 3.17 per cent of the gross earnings. Thus, while in twenty years the earnings had increased from $1,487,000,000 to $6,300,000,000, or 324 per cent, the cost of loss, damage and injuries had increased from a total of $15,461,502 to $199,591,261, or an increase of 1,191 per cent.

Payments Made by Electric Railways

While confined to one year and therefore not nearly so satisfactory as the complete data concerning the steam railroads, Table II, from the United States Census Report for 1917, is illuminating.

A considerable difference in percentage is shown for the various geographical groups, but the two groups showing the highest and the lowest cost contain comparatively few companies and the variations shown are no greater than between individual companies in approximately the same geographic locations.

Information Gleaned from Questionnaires

From the questionnaires sent out additional data were obtained, which, with the complete statistics of the steam railroads, permit us to group the various classes of utilities in regard to the relative cost of accidents. The large number of responses to the request for the gross earnings and accident costs was most gratifying. It is believed that a sufficient number of companies in each group replied to make the results shown in Table III fairly representative.

The earnings and accident costs were separated strictly in accordance with the character of the service, with the single exception of the item "City and Interurban Railways." Here the earnings and accident costs are shown for one group of companies operating both classes of service in such manner that it was impossible to make a separation between city service and interurban service.

Variation Shown Between Individual Companies

It will be noted that the percentage of gross earnings required to meet accident costs for water, telephone and telegraph, gas, and electric light and power companies is relatively small, while among transportation companies, that group whose business is the carriage of human beings in vehicles that are operated in public streets (that is, the city surface railways) has the highest percentage of accident cost.

TABLE II—ELECTRIC RAILWAYS OF UNITED STATES—ACCIDENT COST, 1917

District	Gross Earnings	Accident Cost	Per Cent
New England	$68,399,091	$2,883,646	4.2
Middle Atlantic	230,354,775	8,529,035	3.7
East North Central	162,091,962	5,465,417	3.3
West North Central	52,455,024	2,140,595	4.1
South Atlantic	42,426,736	1,455,076	3.4
East South Central	15,882,474	955,783	6.0
West South Central	20,166,036	887,217	4.4
Mountain	10,294,660	233,285	2.3
Pacific	48,079,048	1,193,377	2.5
Total	$650,149,806	$23,743,431	3.65

TABLE III—ACCIDENT COST OF PUBLIC UTILITIES EXPRESSED IN PERCENTAGE OF GROSS EARNINGS

	Average of Last Five Years		
	Gross Earnings	Accident Cost	Per Cent of Gross
Water companies	$6,961,896	$15,713	0.225
Telephone and telegraph companies	387,800,942	1,179,312	0.304
Gas companies	94,616,598	441,365	0.466
Electric light and power companies	159,672,546	847,977	0.531
Elevated and subway lines	89,553,846	1,337,164	1.49
Interurban railways	20,329,306	425,773	2.09
Steam railways	4,940,000,000	119,120,000	2.41
City and interurban railways	41,122,343	1,551,424	3.77
City street railways	337,272,147	14,274,290	4.23

NOTE: Amounts shown above for gross earnings and accident costs are only for companies replying to questionnaires, and do not represent total figures for the United States except in the case of steam railways. The information shown in this tabulation is expressed graphically in the accompanying chart.

TABLE I—STEAM RAILROADS OF UNITED STATES—PAYMENTS ON ACCOUNT "LOSS AND DAMAGE" AND "INJURIES TO PERSONS" AND PROPORTION TO GROSS EARNINGS

Year	Gross Earnings	Loss and Damage Amount	Loss and Damage Per Cent of Gross	Injuries to Persons Amount	Injuries to Persons Per Cent of Gross	Total Cost of Accidents Amount	Total Cost of Accidents Per Cent of Gross
1900	$1,487,044,000	$7,055,622	0.474	$8,405,980	0.565	$15,461,602	1.04
1905	2,082,482,000	19,782,692	0.950	16,034,727	0.770	35,817,419	1.72
1910	2,750,667,000	30,984,854	1.127	23,665,488	0.860	54,650,342	1.98
1915	2,956,103,000	37,947,468	1.284	27,090,222	0.916	65,037,690	2.20
1916	3,679,989,000	31,274,827	0.850	30,156,759	0.819	61,431,586	1.66
1917	4,074,672,000	94,079,992	1.082	34,109,331	0.837	78,189,323	1.91
1918	4,969,910,000	66,300,736	1.334	34,229,536	0.689	100,530,267	2.02
1919	5,231,750,000	117,671,790	2.250	38,238,803	0.731	155,910,593	2.98
1920	6,300,160,000	142,227,070	2.260	57,364,191	0.910	199,591,261	3.17

In each group of utilities, individual companies showed a great variation in percentage of accident costs, but a company having a high percentage is not necessarily operating in a careless or negligent manner. Local conditions with regard to the activity of personal-injury lawyers, the laws of the state, and local precedents have a most important bearing on the costs of accidents but no relation to this number or seriousness.

As an illustration: In two large cities, not widely separated, both companies efficiently managed, the cost of accidents in one is 2 per cent of the gross earnings and in the other 8 per cent of the gross earnings. For a typical large company with gross earnings of $5,000,000 a year, the difference between 2 per cent and 8 per cent in the cost of accidents is $300,000 a year, which is equivalent to carrying charges at 8 per cent on $3,750,000.

While it is natural, perhaps, to view the importance of the financial side of accident prevention from the percentage of gross earnings required to meet the cost of accidents, no company having a ratio less than the average should feel that it is doing the best it can, or that it is impossible for it to make further reductions in the number and cost of accidents.

It is found that the relative importance of various classes of accidents changes from year to year. For instance, a number of years ago boarding and alighting from cars was the most serious cause of accidents on street railways, while accidents due to collisions with vehicles were not a severe drain. The use of inclosed platforms and doors has done much toward the elimination of step accidents, while the increasing number of automobiles used and the greater congestion in city streets therefrom have made automobile accidents the most expensive class for street railways. An analysis of the amount of money expended during a year or two years, classified as to the causes of the accidents, will be a better criterion by which to select the field for intensive work in reducing accident expense than the number of accidents occurring in any particular classification. In view of the difficulty experienced by utility companies in assembling comprehensive accident data, it might be to the interest of all concerned if the various national associations or governmental agencies would assume the task of compiling this information and analyzing it so as to point the way for a reduction of this tremendous tax on industry and business.

Humanitarian Side of Work Comes First

In view of the experience of every class of utility and industry, might it not be well to work for greater co-operation in combating that insidious and extremely costly evil, the activities of the "ambulance-chasing" personal-injury lawyer?

Always keeping in mind that the humanitarian side of accident-prevention work comes first, nevertheless let us not forget that the financial side is where we find the measure of economic loss, that whatever we may be able to do to reduce the number of accidents is so much accomplished toward eliminating irretrievable waste, is so much won for the economic improvement of the entire nation.

The Human Side of Our Business*

Decent Treatment of Workmen by Those in a Supervisory Capacity as Much a Factor in Accident Prevention as Safety Devices on Dangerous Machines

By Britton I. Budd
President Chicago Elevated Railroads and Chicago, North Shore & Milwaukee Railroad

THERE is a trite saying that "there is no sentiment in business." Equally shopworn is the phrase that "corporations are soulless." The fact that so many representatives of large corporations and of big business enterprises are here today to discuss methods of conserving human life and limb is as complete a refutation as could be found of the challenge that corporations are soulless and that there is no sentiment in business.

I shall approach my subject from a different angle than that usually taken at safety gatherings of this kind. By that I mean that I shall not dwell on the human misery caused by accidents, the number of which, happily, is being gradually and surely reduced year by year by the excellent educational work carried on by the National Safety Council. That particular phase of the "human side of our business" is well understood by all who are engaged in this great work of accident prevention. It makes an appeal which no one can resist.

But there is another angle to the human side of our business which is closely related to accident prevention and which I think sometimes is not as much emphasized as it ought to be.

Decent treatment by men in a supervisory capacity of those working under them is, in my judgment, as much of a factor in accident prevention as are the safety devices which we place on dangerous machines and on which we lay so much stress. I will go further and say it is a more important factor, because if workmen are not treated as thinking human beings by those having authority over them, they are constantly in such a frame of mind that they will cause accidents in spite of all the safety devices and precautionary methods that can be adopted.

It is a common saying that the best safety device is a careful man. I fully agree with that saying, but would add that to make a man careful you must treat him in a way that makes him contented in his work, in a way that will make him glad to meet his foreman or superintendent rather than afraid to meet him. That is the human side of our business which I wish to emphasize.

Fear is one of the causes of accidents. Frequently we call it "carelessness," but if we look more carefully into the subject, we may discover that the seeming carelessness was due to a nervous condition. Those who have made close study of accidents in a shop or factory have found that a frequent cause of accident is some trouble over which the workman was brooding at the time the accident occurred. The cause of the brooding may have been some family trouble, or some difficulty with a foreman or a superintendent, but it was sufficient to bring on a nervous strain that took the workman's mind off his work.

How many times have you observed a workman under the critical eye of a foreman become so nervous and excitable that he scarcely was conscious of what he was doing? Some workmen are of an excitable temperament, and it requires only some tactless act on the part of a foreman to put them in a frame of mind in which they are largely irresponsible.

Men in positions of authority have a great deal of responsibility in the matter of safeguarding the lives and limbs of workmen under them. In some respects they bear the same relation to the men under them that the father does to his child. A wise father does not exact obedience from his child through fear of punishment, but through respect. He must set a good example and win the child's confidence by kindliness. A child in constant dread of his father may, for a time, have respect for authority, but soon he will have little respect for the father.

It is the same with the foreman or superintendent who seeks to enforce discipline by harsh treatment of the workmen under him. He loses their confidence, with the result that the character of the work itself usually is inferior and the danger of accidents is greatly increased. What is needed is a little more human understanding, or, in other words, a closer study of the human side of our business. Every one who has had experience in dealing with men knows the effect of an accident on the morale of the working force. For a time after the accident takes place the shop or railroad is demoralized. Fear has crept in and weakened the morale.

So it is if men are in constant fear of their foreman or superintendent. The morale of the force is weakened and to that extent the danger of accidents increased. I do not wish to convey the impression that I think men always should be patted on the back, or that strict discipline should not be maintained. Although I believe there is, and should be, some sentiment in business, I do not believe in sentimentality.

*Abstract of address presented at the annual convention of the National Safety Council, Detroit, Aug. 28-Sept. 1, 1922.

My contention simply is that the cheerful manner, the sympathetic word, the kindly act will bring much better results than the gruff and domineering manner or harsh treatment.

Especially Important on Electric Railways

In the electric railway industry, with which I am connected, the human side is of the greatest importance. Success in our industry is dependent on the good will of the public, and the public forms its opinion of a company largely by the conduct of the employees with whom it comes in direct contact.

It is of the greatest importance, therefore, that the employees of a company engaged in the service of the public be cheerful and contented in their employment, that they be courteous and polite to the customers of the company; that they, in fact, consider themselves a part of the company.

To produce such a spirit among employees it is essential that they be treated as human beings. If those in authority do not treat the men under them with proper respect, how can they expect the men to treat the public courteously and respectfully? When the employees serving the public are in a happy and contented frame of mind their good humor extends to their passengers. On the other hand, if the employees are grouchy and irritable, their manner irritates their passengers. Keep employees in a contented and happy frame of mind and many of our troubles will disappear.

Human nature is much the same the world over. Seldom do we find a man so callous that he will not respond to a touch of real human sympathy. Seldom do we find a man who will not inwardly, if not outwardly, resent unjust or harsh treatment.

The brief message which I wish to bring to you men, most of you occupying positions of authority, is that the human side of our business is more important even than the financial side, because it is necessary to the financial success of our business that we establish and maintain good human relations. The more attention we pay to the human side of our business, the more successful will we be on the financial side. The better that our human relations are with the men who work for us, the safer will our operations be, whether on the railroad or in the shop or factory.

The Proposed Public Utilities Advertising Association*

By W. P. Strandborg
Chairman Organization Committee, and Publicity Agent Portland Railway, Light & Power Company, Portland, Ore.

IT SEEMS strange that the public utility industries, such as electric railways, light and power, gas, telephone and others, have never been able to put their publicity and advertising work on the same basis as other large organizations of less vital importance to the American people. We have in the four major utilities enumerated, a total capital investment of over sixteen billion dollars, and protection of that investment is largely in the hands of the public who legislate and regulate concerning utilities with and without our own leave.

Now we all know that a very large and important element in the creating and maintaining of good will on the part of our customer public must be looked after by the men who are identified with that important section of our industry—the public relations men, and under this classification of course come our active advertising and publicity managers. So that in proposing the organization of a Public Utilities Advertising Association, the foregoing is a birdseye view of the field within which we may properly and profitably function. It is proper to include both publicity and advertising men in the new association, because in a very large number of cases, both the publicity and advertising activities of the individual companies, as well as of the national associations, are directed by the same leader or at least by the same staff of workers.

One of the important thoughts in mind in connection with the proposed plan is to get away, so far as possible in our public utility life, from the so-called "press agent" who in many of our utilities and other industries for years past has had for his chief duty the questionable assignment of trying to put things over on the newspapers and other publications. We hope to develop within our new organization a firm, fixed policy, subscribed to by every concern that joins our ranks, to the effect that we pledge ourselves to go out after advertising and publicity work on a strict business basis and pay for what we get. In other words, the men who are behind the new movement are firmly convinced that there is no place in our industry any longer for the man who tries to beg, borrow or steal space in the newspaper, but there is a growing demand for the presentation of our public utilities story in a frank, honest and fearless manner.

Millions of dollars are spent for advertising each year by our public utilities, and with very few exceptions, each advertising manager spends his money in his own way and works out his own campaigns without relation to or consideration of the great and universal problems that affect both the personal and physical service of all companies. It is not hard to understand why the situation is so, for the reason that until very recently the individual public utility advertising manager has had no clearing house through which valuable ideas and suggestions that would be of benefit to him in his local activities could be presented and worked out through the associated effort of the most skillful advertising and publicity men in the industry.

We find occasionally that a national convention will give a publicity or advertising man place on the general program for reading a paper. Sometimes a round table conference, or an informal meeting of publicity and advertising men is included in the activities of the national convention, but beyond that we have practically been orphans.

It is not the purpose of the new Public Utilities Advertising Association to supersede or duplicate any of the constructive work now being done by national associations within our major public utilities. It is rather to work with them, and perhaps to co-ordinate their efforts with ours in such a way so that we will all be mutually benefited. The fact that the men directing the advertising and publicity work in the A.E.R.A., A.G.A. and N.E.L.A. are all represented on our organization committee is evidence enough that there is a valuable work for us to do, and that these national leaders are willing to co-operate with us in bringing all the utilities together into one efficient operating body. We hope likewise to secure the fullest co-operation from the great manufacturing industries which are identified in a business way with one or more public utility organizations.

The new Public Utilities Advertising Association has the backing of the major utilities themselves, also of approximately fifteen of the directors of state committees on public utility information, and scores of individual companies whose favorable attitude has been reflected in the large volume of inquiries which has come to the organization committee during the past sixty days. In addition to this, it is very gratifying to know that many trade publications dealing with public utilities have requested further information about our movement, and the editors of these publications have expressed their emphatic indorsement of the plan and tendered the fullest use of their columns.

Technical details of the plans for organization need not be discussed at this time, for they will properly come through the selection of sub-committees when our general organization conference is held in Chicago during the coming American Electric Railway Association convention, to be held on the Municipal Pier during the week of Oct. 2-6, inclusive.

Another point. We hope to have our association admitted as a department of the national advertising commission and to conduct our own convention each year as part of the great world advertising convention, and it is through contact and association with these thousands of advertising experts that we shall derive the greatest benefit from our proposed Public Utilities Advertising Association.

*Abstract of paper presented at the convention of the Associated Advertising Clubs of Iowa, Mason City, Ia., Sept. 12-13, 1922.

French Tramway Track Construction

Engineer of Paris Unified Transportation System Points Out Some Special Features of Track Problems in that City—Several Rail Sections Evolved from Experience Are Given

THE coming discussion on the 1922 report of the committee on way matters of the American Electric Railway Engineering Association renders timely a brief review of the report presented at the last (1921) meeting of L'Union des Voies ferrées d'intérêt local et des Transports publics automobiles, by M. Gagné, chief engineer of electric services, track and buildings of the Société des Transports en commun de le Region parisienne (the unified system in Paris). This report covered the subject of tramway track construction and traced the history of tramway track construction back to its beginning in France.

The author said that at the close of the war, when the question of standardization came up, the union had been able to utilize, without undertaking new investigations, the work which it had done before 1914, notably on grooved rails. Only the five types shown in section below had been conserved. These rails are known respectively as U.V.F.1, U.V.F. 2, U.V.F. 3, U.V.F.L. and U.V.F. 5.

Rail U.V.F. 1 is the section employed for tangent track in the important centers where traffic is intense. Rail U.V.F. 2 is an adaptation of the preceding for curved tracks. Rails U.V.F. 3 and U.V.F. 5 are lighter sections intended for systems in smaller cities. The section U.V.F.L., with a large groove, is for use in track where both tramways and steam railroads must be accommodated on the same stretch of track.

In the U.V.F. rails the form of cross-section is based on the following principles: The base of the rail is made as wide as possible, compatible with the possibilities of rolling; while the web has the minimum permissible thickness, to keep down the weight and at the same time not permit bending, in order to reserve for the parts subjected to wear the greatest amount of metal possible. The position and height of the head with respect to the groove were determined in such a way that when the flange of the wheel bears on the bottom of the groove the head will yield the maximum of wear. The author points out that as researches have shown that the best form for the wheel tread is a cylindrical surface, the surface of the rail on which the wheel rolls should be a plane.

Special Rail Sections for Use on Curves

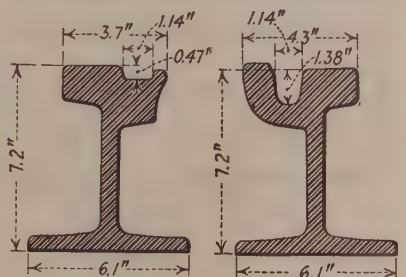
The quality of the steel of the rail was made the subject of careful study by the tramways companies, particular attention having been directed to this matter after American rails had been purchased in 1915. These gave better results than the pre-war French rails. As a result modifications in the specifications for rail steel have been made.

Tests have also been undertaken with alloy steels, such as titanium-steel, silicon-steel, etc. The tests include rails treated by the Sandberg sorbitic process. No conclusions have been reached as to these special rails.

Manganese steel has been used for a long time on curves. It is well known that on curves it is the guard section of the inside rail which wears most rapidly, so that the first inclination would be to make only this guard section of manganese steel. Further, it is known that to diminish the wear on the guard of the inside rail and of the rolling surface of the outside rail, it is desirable on curves to raise the bottom of the groove in the outside rail so that the flange of the wheel will roll on the bottom of the raised groove and not the wheel tread on the rail surface.

The use of a separate manganese guard rail was considered to involve troublesome maintenance so that there were made in 1913 some special manganese rails which gave excellent results. The inside rail was made with a heavy guard section and a deep grove, while the outside rail had a light guard section and a shallow groove. The use of these special section rails of manganese on all curves of less than about 100 ft. radius has been decided upon in Paris, but the rails will have the modified sections shown in section below. These were designed to utilize most effectively the expensive manganese steel.

The Paris company has adopted three types of tongue switch corresponding to three radii of the branch-off curves approximately 65 ft., 100 ft. and 165 ft. The author notes that some systems have successfully employed tongue switches with a mate opposite. It does not appear that this can be done in all cases, but its advantages recommend it in many.

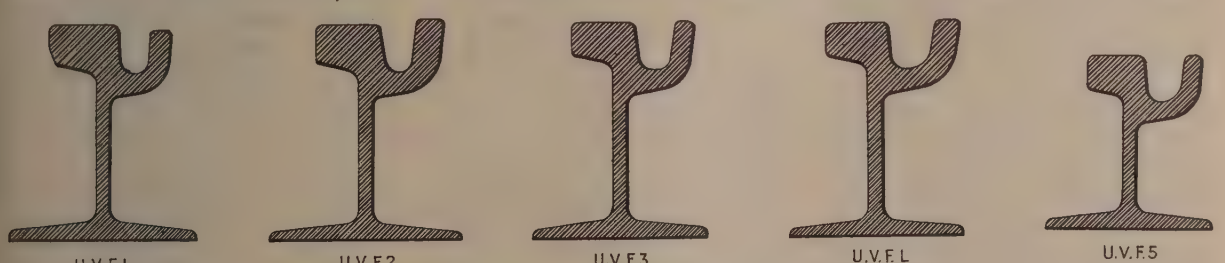


SPECIAL MANGANESE RAILS FOR USE ON CURVES WHERE SERVICE IS SEVERE

The engineers of the company have therefore been studying, but only for the 65-ft. radius switch, the use of a mate, or, as the author terms it, "a fixed-point switch."

As to the system of switch control the T.C.R.P. (Paris unified system) has employed a plan in which several switches are controlled from a control station. Satisfactory results have been obtained from this and the author anticipates the perfection of automatic electric control based on the same principle. He says that France seems to be slow in the solution of this problem which has been solved in other countries.

Much of the lack of success in previous electric control experiments has lain in the imperfect functioning of the electro-magnet. The T.C.R.P. has preferred to change the control system, and in place of the magnet uses a motor as



FIVE STANDARD FRENCH GIRDER GROOVED RAIL SECTIONS

U.V.F.1, for heavy traffic, tangent track; U.V.F.2, same, but for curves; U.V.F.3 and 5, for lighter traffic; U.V.F.L., for use where steam railroad cars must be accommodated.

DIMENSIONS OF FRENCH TRAMWAY RAILS—ALL DIMENSIONS IN INCHES

	U.V.F.1	U.V.F.2	U.V.F.3	U.V.F.L.	U.V.F.-5
Height over tread	7.1	7.1	6.9	6.9	5.7
Width of base	6.3	6.3	5.7	5.7	5.5
Thickness of web	0.43	0.43	0.41	0.41	0.40
Width of head over all	4.0	4.25	4.0	4.45	3.75
Depth of groove	1.57	1.57	1.57	1.57	1.5

in steam railroad practice to operate the switch.

In connection with this apparatus the following points have been considered: The condition of security must come before all others, and all chances of collision must be eliminated. The apparatus must be arranged in such a way that the switch tongue in repose remains open for the right track. A motorman going to the right will have no operation to perform, while one passing to the left will throw the switch while passing without current under a contact some distance ahead of it and will restore the switch to the normal position in passing under a contact outside the danger zone beyond this.

American Association News

New York Central Train Leaves Sunday

THE schedule of the special train to the American Electric Railway Association convention over the New York Central lines has now definitely been set. A special train for the convention over the New York Central lines will leave the Grand Central Terminal, New York, at 1 p.m. Sunday, Oct. 1, connecting at Albany with a special car or cars leaving Boston at 10 a.m. on the same day. Stops will be made at Poughkeepsie, Schenectady, Utica, Syracuse, Rochester, Buffalo, Cleveland and Toledo, as well as at Worcester, Springfield, Pittsfield, and Chatham on the Boston & Albany. The train is scheduled to reach Chicago at 1 p.m. on Monday, Oct. 2. The one-way fare from New York, exclusive of Pullman, is $32.70, and the round trip $49.05. Entertainment and special features are being arranged.

Reservations of those from New York State should be sent with remittance to C. B. Keyes, General Electric Company, 120 Broadway, New York, who will supply other information. Those who wish reservations on the special car from Boston should make reservations with and send remittance to F. F. Stockwell, general manager Barbour-Stockwell Company, 205 Broadway, Cambridgeport, Mass. Accommodations will be allocated in the order in which they are received. The return tickets have a final return date of Oct. 12 and will be good on any New York Central train except the Twentieth Century Limited.

Program of the Claims Association

AN EIGHT-PAGE pamphlet, entitled "The President Has the Honor to Report to You," has been issued by the Claims Association, giving an account of the topics to be taken up at the Chicago convention, the objects sought by the association, subjects at previous meetings and other information of value to all interested in safety and claims.

Sessions of the Claims Association will be held on the afternoons of Oct. 2, 3, 4 and 5, and the program will be built around the four following basic subjects: Prevention of accidents, discouraging unreasonable claims, minimizing inequitable expenditures and defending litigation.

Program of the Accountants' Association

THE final program of the American Electric Railway Accountants' Association for the 1922 convention is now available and is presented below:

MONDAY MORNING, OCT. 2

9.30 A.M. to 12.30 P.M.

Registration and distribution of badges at booth at Municipal Pier.

MONDAY AFTERNOON

2.00 p.m. to 4.30 p.m. Meeting held in Accountants' Hall.

Annual address of the president.

Annual report of the executive committee.

Annual report of the secretary-treasurer.

Appointment of convention committees on resolutions and nominations.

Four-minute address on safety by a representative of the Transportation & Traffic Association.

Report of Committee on Standard Classification of Accounts, H. L. Wilson, treasurer Boston Elevated Railway, chairman.

Address on "Present-Day Responsibilities of Public Utility Accountants." by Walter H. Timm, clerk New Hampshire Public Service Commission.

TUESDAY AFTERNOON, OCT. 3

2 p.m. to 3 p.m. Joint meeting with Engineering Association, to be held in Engineers' Hall.

Four-minute address on safety by a representative of the Transportation & Traffic Association.

Report of joint engineering-accounting committee—Charles R. Harte, chairman (Engineering); H. C. Kimball, chairman (Accountants).

Paper—"Related Function of Engineer and Accountant in Public Utility Development," Edwin D. Dreyfus, engineer West Penn Railways, Pittsburgh, Pa.

At the conclusion of the discussion of Mr. Dreyfus' paper the Accountants will adjourn to Accountants' Hall and the accounting session will be continued as follows:

3:00 p.m. to 4:30 p.m. Report of committee on stores accounting—R. A. Weston, special accountant the Connecticut Company, New Haven, Conn., chairman.

General Forum—A "round table" talk, which was a feature of the 1921 convention, will follow the report of the committee on stores accounting.

WEDNESDAY AFTERNOON, OCT. 4

2:00 p.m. to 4:30 p.m. Meeting held in Accountants' Hall.

Four-minute address on safety by a representative of the Transportation & Traffic Association.

Report of committee on relations with other associations, M. W. Glover, general auditor West Penn Railways, chairman.

Address on "The Budget—Its Preparation and Administration," by Harry A. Snow, assistant controller the Detroit Edison Company.

THURSDAY AFTERNOON, OCT. 5

2.00 p.m. to 4.30 p.m. Meeting held in Accountants' Hall.

Four-minute address on safety by a representative of the Transportation & Traffic Association.

Report of committee to represent Accountants' Association at the annual convention of the National Association of Railway & Utilities Commissions, by W. L. Davis, auditor Lehigh Valley Transit Company, chairman.

Informal talks by past-presidents and presentation of badges. "Master of Ceremonies," William F. Ham, president Washington Railway & Electric Company.

Report of convention committees on resolutions and nominations.

Election and installation of officers.

Adjournment.

Red Special Reservations

THE schedule of the "Red Special" is out. The train runs as a second section of the Pennsylvania Liberty train No. 5, leaving New York at 11:05 a.m. (standard time) on Saturday, Sept. 30, reaching Chicago about 9 a.m. Sunday morning. Reservations may be made with the following: New York, C. H. Beck, Room 2101, 165 Broadway; Philadelphia, Thomas H. Cooper, Westinghouse Electric & Manufacturing Company, Widener Building; Baltimore and Washington, L. H. Palmer, United Railways & Electric Company, Continental Building; Pittsburgh, F. G. Hickling, Westinghouse Electric & Manufacturing Company, Union Bank Building. Accommodations on the return trip can be arranged in Chicago with the Pennsylvania representative F. E. Scott, who will accompany the "Red Special" to Chicago, and will have headquarters on the pier during the convention. Baggage will be handled as usual.

Meeting of Publicity Agents

FOLLOWING the plan adopted at the Atlantic City convention in 1921, the publicity agents of railway companies in attendance at the convention will hold a round table discussion on Wednesday afternoon. The time of meeting has been set at 2:30 and the place is the Better Health Exhibit room on the pier. Labert St. Clair says that no set program has been arranged for the meeting, but a profitable time may be expected by all in attendance.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Strike Fund Financed

Philadelphia Men Back Mr. Mitten with $1,000,000 to Carry On Campaign Against Jitney at Buffalo

Trustees of the co-operative wage dividend fund of the employees of the Philadelphia Rapid Transit Company have arranged for the purchase from the trustees for the stockholders of the International Railway, Buffalo, and the future resale to them, of $2,000,000, par value, of International Railway 5 per cent bonds for $1,000,000, the proceeds to be used by the International to continue the fight against union domination of the local and interurban lines of the company in western New York.

This announcement on the part of Thomas E. Mitten, chairman of the board of directors of the International, came as a severe blow to the motormen and conductors at Buffalo who have been on strike since July 1. Within the last week there have been many desertions from the ranks of the strikers and a large number of former strikers are now operating local and interurban cars on the International lines.

MAYOR'S PROPOSAL FLATLY REJECTED

Walter P. Cooke, one of the three voting trustees of the International and chairman of the board of the Marine Trust Company, Buffalo, to whom Mayor Frank X. Schwab appealed to help end the strike by appointing two members of a board of arbitration to settle the problem, flatly rejected the Mayor's proposal. He said:

> In the recent strike in which Mr. Tulley (president of the International) and his associates had to contend with a campaign of intimidation and lawlessness, they conducted a dignified, manly and straightforward fight which I believe must have commanded the respect of all thinking people.
>
> I have talked with Mr. Tulley in reference to your desire that the company should enter into your proposed arbitration and beg to advise you that the company feels for the reasons already repeatedly stated that it is unable to comply with your request.

Added impetus has been given the campaign of the International to rid the streets of jitneys which are operating in defiance of the Supreme Court and the Appellate Division by the decision of Justice Harley N. Crosby of the Appellate Court, who has denied the motion to vacate his anti-jitney injunction requiring Mayor Schwab to remove the jitneys from the streets of Buffalo. The motion to vacate the injunction was made by counsel for the jitney drivers.

The opinion of Justice Crosby points out that the operation of jitneys is not only "positively forbidden by law but that it is indeed actually criminal." The opinion, in part, says:

> Such of the defendants, if any such there be, as entered upon their illegal business in the belief that they were acting legally, may well be entitled to sympathy, but the imposition practiced upon them was not practiced by the plaintiff (the International Railway) nor by the courts. The law must be respected. Our courts have never gone the length of giving endorsement to acts that were made criminal by law.

Despite the decision of Justice Crosby, Mayor Schwab and the police are giving practically no support to the International in its efforts to rid the streets of jitneys. Traffic police are ignoring the jitney drivers who are racing up and down Main Street and the principal East Side thoroughfares. Private detectives have been retained by the International and with the aid of officers of the company evidence is slowly being obtained which has resulted in scores of jitney drivers being fined from $50 to $250 and more arrests will be made. The campaign will be continued by President Tulley and his associates until there is no more competition from jitneys.

Passenger travel over the local and interurban lines of the International has shown a big increase in the last week. Travel over the Park & River division of the company at Niagara Falls is normal and traffic on many of the West Side lines in Buffalo is normal. Few passengers are riding on the East Side, although there has been an increase of almost 50 per cent in the last week. The Buffalo-Lockport, Buffalo-Niagara Falls, Buffalo-Tonawanda and Buffalo-Depew lines are carrying a good quota of passengers.

Louisville Stockholders Approve Franchise Settlement

With about forty persons attending the stockholders' meeting of the Louisville (Ky.) Railway on Sept. 11 and 72,000 shares represented, some 65,000 shares by proxy, the agreement with the City Council for the new franchise ordinance was ratified. As a result the 6-cent ticket fare will become effective on Sunday, Sept. 17, provided the injunction is dissolved that was secured in the Federal Court some nineteen months ago, preventing the city from interfering with the company in the collection of the 7-cent fare. It is expected that action by the court will be quickly accomplished. Tickets or metal tokens will be sold at five for 30 cents, but cash fares will remain at 7 cents.

James P. Barnes, president of the company, said:

> Our attorneys and representatives of the city will go before Judge Walter Evans in Federal Court on Sept. 13 and make the necessary motions for withdrawal of the suit and modification of the injunction. What the motions will be, I am unprepared to say, as this is a matter to be determined by the attorneys. But there was complete accord among the directors that the plan of settlement as already agreed on by the city be accepted. So I am hopeful that beginning next Sunday, the new rate will be in effect.

Mr. Barnes announced that steps will be taken at once to work out with the Board of Public Works, the plans for expending $900,000 for improvements. These improvements will include the purchase of approximately eighty one-man cars; the installation of electrical machinery at its High Street power house of capacity sufficient to carry all of the present load; and to provide facilities for the comfort, convenience and welfare of its employees at carhouses and in shops.

The $900,000 is the excess accumulated by the company since the 7-cent fare became effective on Feb. 21, 1921, but which it was not permitted to spend because of the litigation over the fare question. The sum will not be added to the company's capital account, and hence will not be reckoned on its earnings against the barometer fund.

Electrification Plans Under Way by British Columbia Railway

The British Columbia Electric Railway, Vancouver, B. C., is electrifying six miles of steam railway connecting its Stave Lake Power plant with the Canadian Pacific Railway at Ruskin, B. C. The line is used mainly for hauling logs from the lake above, past the power plant and rapids. At present, the company is building a million dollar dam and the line will be used for hauling gravel from a point down the Stave River. Two steam locomotives have been used with a gasoline car for passengers. The voltage will be 550 and there will be one substation comprizing three transformers and one 400-kw. motor-generator set. Considerable saving in the cost of coal will be made.

As the plans of the company include a second plant on the river and the damming of the stream, the railway line will some time in the future be flooded and dismantled. Electrification work is therefore not entirely permanent. Electric locomotives now used on the company's interurban system will be transferred to the Stave Lake line.

Counsel for City in Utility Cases Resigns

Chester E. Cleveland, Sr., special counsel for the city of Chicago in charge of street car, elevated, and phone rate litigation, has resigned. In his note, dated Aug. 9, in which he asked to be relieved from duty on Sept. 1, Mr. Cleveland assigns no reason for wanting to step out of public service. Corporation Counsel Ettelson gave no explanation for Mr. Cleveland's action. His announcement of retirement from the city's service says only: "Chester E. Cleveland, having resigned as special assistant corporation counsel, will engage in the practice of law."

Minority Report Favored

Recommends Ten-Year Franchise Extension for Winnipeg Railway—Referendum Expected Soon

The franchise under which the Winnipeg (Man.) Electric Railway operates provides that in 1927—thirty-five years from the date on which it was originally granted—the city of Winnipeg shall have the option to purchase the railway property.

During the war and after the war period, the company, like practically every other public utility company, was unable to make large capital expenditures and from 1914 to the present time only a few extensions to the system have been made. Since taking charge of the property in the fall of 1917, A. W. McLimont, the vice-president and general manager, has made a great and successful effort to rehabilitate the property and to bring it into a high state of efficiency, which conditions consequent upon the first three years of war had impaired. For some time past the city authorities have been demanding of the company that it make a number of extensions to the system, calling upon it also to put its wires underground and to carry out certain other improvements which entail the expenditure of a large sum of money.

PROGRAM OF WORK OUTLINED

After considerable negotiations between the company's officials and a subcommittee of the City Council, an agreement was reached as to what was deemed necessary and expedient to do. The program of work outlined called for the expenditure of a considerable sum of money. The company found that owing to the uncertainty of the future it was necessary to provide some better security than it was in a position to offer, and, consequently, asked that the city defer to 1937 the right to exercise its option to purchase the property in 1927. This, it was pointed out, would permit the company to issue a security that would be salable and provide the necessary funds. When this proposition was made to the City Council it was referred to a special subcommittee. This sub-committee demanded certain concessions from the company before agreeing to consider the extension asked for, and the company replied with a proposition in which it stipulated the extensions to be made, the provision of motor bus service where necessary, and a promise to put into effect a sliding schedule of fares which, by Aug. 1, 1925, will put the whole system on a ticket fare of 5 cents. The proposed schedule was published in the *Electric Railway Journal*, Aug. 12.

Two of the five members of the subcommittee were in favor of the company's proposal and recommended to the Council in a minority report that the committee be instructed to continue the negotiations with the company and effect an agreement giving the ten years extension. It also recommended that the question of taking a referendum on the agreement be reported upon. The other three members of the committee opposed dealing with the company's application at the present time, suggested delaying action until the experience with municipal ownership in Detroit, Toronto, and Seattle had been thoroughly tested, and proposed that in the meantime the city of Winnipeg advance the railway company $1,000,000 to be spent on extensions. The proposal that the city should become the bankers for the company did not find favor with the majority of the Aldermen, and the recommendations of the minority committee were adopted.

Negotiations have again been resumed between the committee and the company's officials with a view to carrying out the instructions of the Council and drafting an agreement incorporating terms upon which the city will substitute the date 1937 for 1927. It has not yet been decided whether or not the agreement when finally passed by the Council will be submitted to the voters for ratification. There is a movement in the city that this should be done, but, on the other hand, the Council is desirous of getting the traction question settled as early as possible, in order that the company might start on some of its proposed work and thus provide employment throughout the winter and at a time when it is most needed.

The municipal elections take place in Winnipeg at the end of November and members of Council individually have expressed themselves as being opposed to permitting the traction question to become a political issue and for this reason it is expected that an agreement will be reached at an early date, and if it is submitted to a referendum the vote will be taken some time in October.

Mayor Couzens Scents a Conspiracy

In a statement made public a few days ago by Mayor Couzens of Detroit it was charged that a number of electric railways have employed private detectives to spread discontent among members of the Amalgamated Association now working for the Department of Street Railways. The statement was made, the Mayor explained, so that the city railway employees may not be misled.

The employees of the city who man the cars of the Municipal Railway are seeking a wage agreement. The Mayor explains that the city charter does not permit the city to recognize a union among the employees of any city department. The city has continued to pay the wage scale that was in effect when the local lines of the Detroit United Railway were taken over on May 15. This scale was fixed by a previous agreement between the Detroit United Railway and the men who have since become city employees.

As the Mayor sees it the effort which he says is now being made to stir up the local men has for its purpose creating discontent among platform men so as to, if possible, destroy municipal ownership of street railways as a policy. The Mayor's statement continued in part:

> The voters of Detroit have repeatedly shown overwhelming evidence that they are liberal and fair with city employees. There is no reason why any trade, division or occupation should be preferred over all other citizens. There is no more reason why an employment agreement should be entered into with the street railway men than with the policeman, fireman or employees of the water or lighting departments.
>
> We have treated our employees fairly and we did not reduce wages when wages were being generally reduced; a trial board has been established to investigate all complaints against employees, and it is our firm conviction that our employees will not be misled or discouraged by interested and selfish propaganda.

$100,000 Reward Offered

Rewards totaling $100,000 are offered by the International Railway, Buffalo, N. Y., for information leading to the arrest and conviction of the person or persons responsible for the dynamite outrages on its local and interurban lines since the strike of trainmen on July 1. Frank H. Gaskill, Philadelphia, head of the secret service of the Philadelphia Rapid Transit Company, who has been in Buffalo for almost a month, is in charge of the investigation. Private detectives from four nationally famous agencies are on the case.

The first reward offered by the International was $10,000, but last week this was raised to $100,000 by Herbert G. Tulley, president of the company, to stimulate interest in the investigation. Rewards commensurate with the value of the information received will be paid to those supplying facts helpful in effecting arrest and conviction of those damaging any other property of the International. The identity of those giving information will be protected and safe conduct out of the country will be given, if desired.

For information leading to the arrest and conviction of those responsible for the dynamiting of the high-speed Niagara Falls line at midnight Aug. 7, the company offers a reward of $20,000 and $10,000 will be given for information leading to the arrest and conviction of each of the other eight dynamite outrages, which were as follows:

East Ferry car at Fillmore Avenue at 12:30 a.m. on Aug. 18, high-speed Niagara Falls line at Gill creek bridge at 3:15 a.m. on Aug. 17, East Ferry car at Wohlers Avenue at 12:05 a.m. on Aug. 12, Fillmore and Delevan Avenue at 5:55 a.m. on Aug. 11, Elmwood Avenue and Middlesex Road at 9 p.m. on Aug. 9, Elmwood Avenue near State Hospital at 6 a.m. on July 30, Lockport line tracks between Hodgeville and Pendleton Center at 7:45 p.m. on July 28 and Cold Spring carhouse at midnight on July 19.

News Letter Appears.—The Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., is publishing a News Letter occasionally for circulation among its employees. The July 18 issue published some interesting company doings and in addition gave a few reminders to platform men on courtesy and safety.

Agreement Reached

San Diego Railway Relieved of Paving —Adams Avenue Line To Be Reconstructed

An agreement was reached on Sept. 14 between the City Council and the San Diego (Cal.) Electric Railway through the efforts of the State Railroad Commission whereby the Adams Avenue car line will be reconstructed at once and the company relieved of paving obligations. It was decided that the city will pave the balance of the street leaving a strip in the center with 2 ft. each side of the track for the company to fill with surfacing material not paving. General Manager Spreckels has announced that work will start at once on double-tracking Park Boulevard to the city limit with concrete ballast and twin steel ties and 93 lb. rails totaling two miles. This ends the controversy in San Diego the direct cause of which was the tearing up of the tracks by the company on Adams Avenue on Aug. 27.

CONTROVERSY OF LONG STANDING

The tearing up of the tracks by the railway came as a climax to a long series of squabbles with the City Council over paving matters. About 1 a.m. Sunday morning, Aug. 27, after the passenger traffic had ceased the railway rushed a car of tools and a gang of about 100 men to Adams Avenue, and with picks, shovels and jacks the work of tearing up the tracks was begun. About 5 a.m. the work was brought to a close when Mayor John L. Bacon, with a squad of policemen, arrived on the scene and ordered the workers to desist and arrested H. A. Kuehmsted, engineer of the railway company, who was directing the work, on a charge of tearing up the streets without permission. But in the four hours work about a mile of track had been torn up.

The following day the city of San Diego had secured a writ of mandate from the Superior Court of San Diego County ordering the company to restore its tracks and service at once or appear in court Aug. 30, at 10 a.m. and show cause why it should not do so. Likewise the City Council, at a special meeting, suspended the ordinance against jitney buses until the "emergency" shall be deemed to have passed.

The next step in the fight was the action of Judge S. M. Marsh, who in the Superior Court on Sept. 7 sustained the demurrer of the railway company to complaint of the city seeking a mandamus to compel the company to restore Adams Avenue tracks on the point that the city was not the proper party to bring action. Other points in the company's demurrer were not ruled on.

Attorneys Titus and Macomber, for the railway company, argued that the city had not stated sufficient facts for a cause of action, and challenged the jurisdiction of the Superior Court in the matter. Attorney Macomber for the railway contended that the city, as a municipal corporation, was not the proper party to institute an action of such nature and that it had not filed the proper kind of action.

Judge Marsh sustained the contention that the city was not the proper party to bring the action for a writ of mandamus, but did not rule on the other points in the demurrer and argument, saying it was unnecessary to rule on the other points after sustaining the demurrer on the one point.

In replying, City Attorney S. J. Higgins argued that since the city was the grantor of the franchise it had the right to regulate rates and service and cited decisions calculated to support his contentions. After the decision was rendered, City Attorney Higgins said he had not decided what course the city would pursue. He intimated that one of three courses was open—allow the matter to rest with the Railroad Commission, with which body complaint had already been lodged by citizens of the Adams Avenue district; file an amended complaint on behalf of the city, or start a new action with a taxpayer of the affected district as plaintiff.

In tearing up the tracks and abandoning service, Mayor Bacon claimed that the railway was acting illegally and violating its franchise contract. The Mayor and his friends asserted that the company could have delayed the paving matter until after the coming election by legal means had it so desired, instead of tearing up the tracks and discontinuing service.

Each side of the controversy accused the other of "playing politics."

The San Diego *Sun*, an afternoon newspaper, made the statement during the fight that the Council was determined to pave Adams Avenue, and that if necessary the railway's property would be seized to pay its share of the bill.

GENERAL MANAGER SPRECKELS EXPLAINS

Early in the fight General Manager Spreckels declared that the hand of the electric railway had been forced and that the tracks were torn up to protect the company against liability for paving Adams Avenue. Further, that his company stood ready to relay its tracks whenever assurance was given the company that it would not be required to bear any paving charges. In his statement to the public under date of Aug. 27 Claus Spreckels reviewed the history of the paving situation. He said that he had under instructions from John D. Spreckels, the president of the company ordered the abandonment of the line. He promised an adequate and efficient bus service operating on the same schedule as that of the railway in order that patrons of the Adams Avenue line would not suffer any inconvenience.

The day following Mr. Spreckels' statement to the public he sent a similar communication to the City Council stating that he had ordered the abandonment of the track and had made arrangements for transportation for residents along the Adams Avenue car line.

$5,000,000 of Assets Behind Amalgamated

W. D. Mahon, president of the Amalgamated Association, is reported to have said at the meeting of the American Federation of Labor in Atlantic City that in 1917 he had obtained a loan of $100,000 from a Boston bank to finance the street car men's strike in New York and that no collateral security was demanded. He is also reported to have said that the Amalgamated owns $5,000,000 of government securities. He is quoted as follows:

> When informed that the New York strike would collapse unless funds were made immediately available. I with other International officials took the train to Boston, obtained the $100,000 without difficulty, being told by the bank officials that they would accept our 100,000 membership organization as quick as an organization of employers or any other. We paid back this loan by an assessment of from $1 to $5 on the membership before $50,000 of the loan had been used up in the strike. The other $50,000 went to the union.
>
> Why should not banks loan to labor unions? Such loans are absolutely safe and secure. Our union, for instance, owns $5,000,000 worth of Government bonds and securities. We have considerable business with banks. The entire cost of the conduct of our international union, $225,000 a year, is paid out of the interest received on the bonds and funds on deposit. Not one cent of the assessments or dues from members is used for salaries or conduct of the international union.

Mr. Mahon's remarks were evidently prompted by comment appearing in the daily papers about loans made by the Harriman Bank in New York to officers representing the striking coal miners.

Arbitration Board Will Decide Wages

An arbitration board will decide the wages to be paid trainmen of the Boston & Worcester Street Railway, although no date has been set for the first meeting of the arbiters. The contract with the car men expired on Aug. 31. Thirty days previous to that date the company notified the employees and the employees notified the management that a change in the articles governing wages was desired. Several conferences were held previous to the expiration of the contract and it was agreed that all articles about wages were satisfactory.

The contract called for arbitration in the event that the company and the men could not agree and prescribed procedure for such arbitration. The old wage was 54 cents an hour; the company offered 52 cents. As they were unable to agree the company told the union it would arbitrate as prescribed.

At a meeting on Sept. 1, against the advice of their officers and the vice-president of the Amalgamated, the men refused to arbitrate and voted to strike at the end of work on Sept. 2 unless the company agreed to renew at the old wage. The men held several meetings during the three days strike, and on Sept. 5 decided to return to work on Sept. 6 and agreed to arbitrate if their officers and the company's officials could not come to a satisfactory agreement in reference to wages. In this case, as in all other cases of wage controversy, the old wage prevails until changed by agreement or arbitration.

Circulation Managers Have Direct Interest in Electric Railways

C. D. O'Rourke, circulation director of the *Journal* and the *Herald* at Dayton, Ohio, was one of the speakers before the members of the Ohio Circulation Managers in convention at Columbus a few weeks ago. The question which he put before the assembled members in the form of a paper was "How will we ship when the auto buses and trucks cause the elimination of the interurban and electric lines?"

In emphasizing some of the things with which he had to contend in his work in shipping newspapers over the electric lines Mr. O'Rourke said that near Dayton five spurs of main electric lines had been torn up within the last few years because the electric lines could not meet operating expenses in competition with the buses. He said that as a result all farm land values and small town real estate values along these electric railway lines had dropped. On a discontinued spur between Franklin and Lebanon the public would not stand for an increase in fare from 25 to 35 cents, but was now paying 75 cents to a bus line, and had to pay five times as much for freight haulage by auto as was paid previously to the railway.

On a discontinued line between Miamisburg and Germantown, the fare by bus is now 50 cents, while it was formerly 15 cents on the electric railway. He said that between Lebanon and Cincinnati no effort was now being made by the buses in service between these places to keep any regular schedule.

Mr. O'Rourke said that morning paper circulation managers should take time to look well into the financial condition of the electric railways. By far the majority of papers are sold to street car patrons. He presented for the consideration of the members in attendance a map on which he had marked the interurban lines which had discontinued service within the past few years, so that they could see just what it now meant to every one interested in newspaper distribution. It seemed to him that the electric railways and the interurban lines asked only that jitneys and buses be put on the same basis with the electric railways, and since the continued operation of the electric railways meant so much to newspaper men as a class, the newspaper men in turn should do everything within their power to help keep the electric railways running. He said that the local electric railway managers would gladly give facts and figures which show many reasons why all the newspaper publishers should be anxious to do all they could to prevent further abandonment of lines by the electric railways.

Usual Big Time at P. R. T. Picnic

Willow Grove Park teemed with good fellowship and rejoicing on Aug. 29 when the fourth annual picnic of the Philadelphia (Pa.) Rapid Transit Company took place. Besides, "a good time had by all" an amount of $10,000 was realized as a starter for the Helping Hand Fund which will be used as a beneficiary for needy employees.

There were so many P. R. T. picnicers that two days were necessary to give every employee an opportunity to attend. The days' events included musical features, athletic contests, etc., with the second day terminating in a dinner for officials and directors of the Co-operative Welfare Association at which Thomas E. Mitten, president of the company, explained what Mitten Management stood for and what it had striven to accomplish. Earlier in the day he delivered another address before the employees at which he said that the dream of his life was to see the employees not only operators but owners of the Philadelphia Rapid Transit Company's stock.

Weekly Pass for Chicago Elevated Approved

Slightly lower fares on the Chicago Elevated Railroad, including the company's plan to sell unlimited transportation on a weekly payment plan, were approved on Sept. 13 by the Illinois Commerce Commission and will become effective next Monday morning, Sept. 18. The commission has made the provision, however, that the pass may not be handed back at the turnstile to another member of the pass owner's party.

The new rate schedule, which provides for the sale of three tickets for 25 cents, instead of four for 35 cents, thus reducing the straight ticket fare from 8.75 cents to 8.33 cents, was explained to the commission at length by Gilbert E. Porter, attorney for the lines. The cash fare remains at 10 cents.

Most of the discussion among the commissioners revolved about the proposal to sell weekly transferable passes for $1.25, good between all points south of Howard Street and for $2 good between points in Chicago and points in Evanston. This plan is considered revolutionary because it has never been tried in American cities of more than 175,000 population.

An extensive advertising campaign to popularize the weekly passes is planned by the lines. Advertising matter already has been prepared and the first appeared in the newspapers on the morning following the approval of the plan by the commission. The officials hope the transfer feature of the passes and the fact that, in addition to their daily use in going to and returning from work, the purchaser or his friends may use a pass to go to the theaters, parks, the corner grocery store, or the downtown department store, will make it a good seller.

Among benefits which "L" officials urge in favor of the pass plan are that it will eliminate standing in line for tickets, with consequent speeding up of service, and that it will increase traffic in non-rush hours, thus increasing the number of short-haul passengers.

News Notes

Seeks Suggestions.—In an effort to secure constructive criticism from employees and passengers the Lincoln (Neb.) Traction Company has been issuing blank cards for service suggestions for its employees to fill out.

Seeks Extension.—Citizens of Van Zandt County, Tex., which has very little railroad mileage, are holding meetings and seeking to induce the Dallas Railway, which is completing an electric interurban rail line from Dallas to Terrell, thirty-one miles east, to extend the line through that county and to Tyler.

Wage Scale Continues.—As the result of an agreement between employees and management of the Birmingham Railway, Light & Power Company, Birmingham, Ala., the present wage scale will continue for another year or until Aug. 31, 1923. The vote taken by the men showed that they were in accord with the company's offer of allowing the present wage to continue.

Article Tells About Trailer Trains.—Trail trains and how far the Cleveland (Ohio) Railway has progressed in the development of adequate service for its patrons has been made the subject of an article in the July-August Ohio Brass Company Bulletin. The account was written by R. G. Averill, commercial engineer of the Ohio Brass Company. Reference is made in the article to statistics of train operation published in the *Electric Railway Journal*, issue of Oct. 2, 1920.

Seeks Mayor's Co-operation.—The Celebration Committee of the Frankford "L," the new line to be operated by the Philadelphia (Pa.) Rapid Transit Company, called on Mayor Moore recently to enlist the co-operation of the city in the program to mark the opening of the new line. After promising municipal assistance the Mayor forecasted other big rapid transit developments which would be speeded up as soon as the Frankford "L" was in operation.

Employees Have Good Courtesy Ideas.—The Georgia Railway & Power Company, Atlanta, Ga., operating the city's street car lines, in a recent contest awarded $100 in ten prizes ranging from $25 down to $5, for the best essays written by employees of the company and dealing with the manner in which courtesy between employees of a public utility and the general public might best be promoted. Many valuable ideas were found in the essays submitted in the contest, some of which the company expects to employ to serve this end. The first prize was won by C. F. Jones, a conductor, while three motormen and one other conductor were also among the prize winners.

Financial and Corporate

Surplus in Montreal

Tramways Realize $187,947 for Year's Operation—Statistics Under Present Grant Included in Report

The fourth annual report of the Montreal Tramways Commission to the city of Montreal has been made public. It contains statistics on the operation from 1921-1922 and a recapitulation from Feb. 10, 1918 (when the contract became effective), to June 30, 1922, "in order to ascertain the present situation." In the accompanying statement of operation it is noted that for the year ended June 30, 1922, a surplus of $187,947 was realized. In the previous years there were deficits and the interested parties, according to the report, in order to avoid an excessive rate of fare, have agreed not to exact immediate payment of the amounts due them.

It was in 1916 that the Montreal Tramways started negotiations with the city officials for additional and extended franchise rights. Opposition developed and finally led to the appointment by the provincial government of a commission to investigate the situation and draft a franchise, fair alike to the company and to the community served. The franchise recommended by the commission, with some modifications, was approved by the city and accepted by the company on Jan. 28, 1918.

The Montreal grant allows a 6 per cent normal return upon capital value. Upon new capital furnished by investors during the war or within two years after its termination an additional 1 per cent is allowed, but this supplementary return is wholly withdrawn within five years after the war. The railway also receives a further return to the extent of 20 per cent of the divisible surplus, the balance of the surplus going to the city (30 per cent) and the tolls reduction fund (50 per cent).

There is no restriction upon the use of the city or company allotments. The company is not permitted to pay dividends on its stock in excess of 10 per cent.

The Montreal grant also provides for two supplementary allowances, one of which is unique in franchise history. Thus there is a fixed annual sum, equivalent to one-half of 1 per cent of the initial capital value ($181,431) for the expenses of new financing, including printing and engraving, legal and registration fees, listings, etc. Any unused part of this allowance must be kept intact with interest accretions until the termination of the franchise, when it may be distributed.

STATEMENT OF OPERATIONS OF THE MONTREAL TRAMWAYS COMPANY
From Feb. 10, 1918, to June 30, 1922

	Feb. 10, 1918, to June 30, 1919	Year Ended June 30, 1920	Feb. 10, 1918, to June 30, 1920	Year Ended June 30, 1921	Feb. 10, 1918, to June 30, 1921	Year Ended June 30, 1922	Feb. 10, 1918, to June 30, 1922
Gross receipts	$11,572,210	$10,782,470	$22,354,680	$11,773,004	$34,127,685	$11,712,525	$45,840,210
Operating expenses and taxes	$6,640,715	$5,849,911	$12,490,627	$6,327,841	$18,818,468	$5,769,403	$24,587,871
Operating profit	45,927	46,606	92,534	47,442	139,976	47,959	187,936
Maintenance and renewals	2,098,120	2,190,557	4,288,678	2,529,054	6,817,732	2,579,200	9,396,932
Total	$8,784,763	$8,087,076	$16,871,839	$8,904,337	$25,776,177	$8,396,563	$34,172,740
Balance	$2,787,446	$2,695,394	$5,482,840	$2,868,667	$8,351,507	$3,315,961	$11,667,469
Allowance due company:							
6 per cent on capital value	$3,018,224	$2,177,177	$5,195,402	$2,177,177	$7,372,579	$2,177,177	$9,549,757
7 per cent on additions to capital	32,919	69,827	102,746	118,859	221,606	145,683	367,290
6 per cent on working capital	40,645	23,832	64,478	12,490	76,969	6,596	83,565
Financing expense	251,353	181,431	432,784	181,431	614,215	181,431	795,647
Total	$3,343,142	$2,452,269	$5,795,411	$2,489,959	$8,285,371	$2,510,889	$10,796,260
Balance, debtor	$555,695	$243,124 (a)	$312,571	$378,707 (a)	$66,136 (a)	$805,072 (a)	$871,209(a) (b)
Payable when earned:							
City of Montreal rental	$692,694	$500,000	$1,192,694	$500,000	$1,692,694	$500,000	$2,192,694
Contingent reserve fund	115,722	107,824	223,546	117,730	341,276	117,125	458,402
Total	$808,416	$607,824	$1,416,240	$617,730	$2,033,970	$617,125	$2,651,096
Deficit	$1,364,111	$364,700	$1,728,811	$239,022	$1,967,834	$187,947 (a)	$1,779,886

(a) Surplus.
(b) Total amount, payable to the city of Montreal, since the coming into force of the contract, on account of its rentals.

MONTREAL TRAMWAYS COMMISSION
Comparative Traffic Statistics from 1912 to 1922

Years from July 1 to June 30	1912–1913	1913–1914	1914–1915	1915–1916	1916–1917	1917–1918	1918–1919	1919–1920	1920–1921	1921–1922
Gross receipts	$6,754,227	$7,142,804	$6,525,231	$6,609,765	$7,725,498	$7,579,410	$8,645,547	$10,782,470	$11,773,004	$11,712,525
Revenue passengers	159,892,021	168,472,952	153,576,271	156,408,303	178,267,232	182,173,701	183,350,923	191,941,835	190,212,799	188,201,367
Car-miles	20,000,000	22,200,000	20,375,050	20,462,845	22,172,469	22,691,507	23,155,516	22,888,670	21,803,871	21,547,343
Total operating expenses	$4,032,664	$4,206,114	$3,713,996	$3,707,053	$4,601,771	$5,255,586	$6,669,340	$8,087,076	$8,904,337	$8,396,565
Net receipts available for payment of fixed charges and dividends	$2,721,652	$2,936,689	$2,811,235	$2,902,712	$3,123,727	$2,323,823	$1,976,207	$2,695,394	$2,868,667	$3,315,961
Gross receipts per revenue passenger, in cents	4.22	4.24	4.25	4.23	4.33	4.16	4.72	5.61	6.19	6.22
Gross receipts per car-mile in cents	33.7	32.2	32.05	32.26	34.90	33.40	37.40	47.11	53.99	54.36
Percentage of gross receipts devoted to total operating expenses	59.5%	58.9%	56.9%	56.1%	59.6%	69.4%	77.14%	75%	75.23%	71.69%
Operating and maintaining expenses per car-mile in cents	20.1	18.9	18.3	18.1	20.8	23.2	28.8	35.33	40.84	38.97
Net earnings per car-mile, in cents, for payment of fixed charges and dividends	13.6	13.2	13.8	14.2	14.1	10.3	8.52	11.78	13.15	15.39
Operating, maintenance and renewal expenses, in cents, per revenue passenger	2.52	2.5	2.42	2.37	2.58	2.88	3.64	4.21	4.68	4.46
Net earnings, in cents, per revenue passenger, for payment of fixed charges and dividends	1.70	1.74	1.83	1.86	1.75	1.28	1.08	1.40	1.51	1.76

Terms of East St. Louis Deal Announced

The conditions have been announced under which E. W. Clark & Company, have entered into an agreement with Dillon, Read & Company, representing the North American Company, for sale of preferred and common stock of the East St. Louis & Suburban Company, owned by E. W. Clark & Company. The agreement provides that all stockholders may sell their stock upon the same terms. The price is $55 per share for the preferred stock and $10 per share for the common stock, payable one-half in preferred stock of the North American Company at $50 per share and one-half in the common stock of the North American Company at $100 per share (the par value of both classes of stock of the North American Company being $50 per share).

The announcement of the impending purchase, made originally in the *Electric Railway Journal* of Sept. 9, has attracted much attention in financial circles everywhere, but particularly in the Central West where both sets of financial interests operate. In Columbus, Ohio, where the Clarks formerly operated, the impending deal has been treated at considerable length. On some of the more personal phases of the matter the *Ohio State Journal* of Columbus said:

> In January, 1919, W. H. Sawyer of Columbus, vice-president of E. W. Clark & Company, Management Corporation, accepted the presidency of the operating companies and undertook to salvage whatever was possible out of what looked to be and really was at that time a discouraging proposition. Columbus bankers, who know the situation, give Mr. Sawyer credit for bringing the operating properties to such a financial condition that the stockholders are now able to cash in on the present basis.

Eight Months' Traffic Increases

The Cincinnati (Ohio) Traction Company transported 330,169 more passengers during the eight-month period which closed Aug. 31, than during the corresponding period of 1921—the first time in five years that an increase in the business of the railway system has been shown. The total number of passengers for the eight months of 1922 was 71,282,908, against 70,952,739 in the corresponding time in 1921. Although the general report for the period is encouraging, W. Jerome Kuertz, Street Railroad Commissioner, in making comparisons for the month of August expressed himself as concerned with the falling off in the passengers carried as compared with July.

In August, 1921, there was an increase of 27,000 passengers over the preceding month. In August, 1922, however, there was a falling off of 99,000 passengers as compared with July.

Commissioner Kuertz attributes the drop to the numerous strikes and the consequent economic depression. However, the number of passengers carried last August was 123,801, greater than the number carried in August, 1921, the figures being 8,783,636 and 8,659,835. The railway patronage showed a steady increase from month to month up to and including July, when there was a drop.

Consolidation Matter Will Be Deferred

Bills to permit voluntary consolidation of the street railway companies of Washington into one corporation will not be considered by the House District of Columbia committee until the December session of Congress. Hearings on the several bills on this subject will be held early in the short session of Congress, according to announcement by the committee secretary.

It is probable that the House committee will shelve the House bills on consolidation and take up the two bills passed by the Senate, in order to expedite the legislation.

After having passed the one bill for voluntary consolidation, the Senate recently passed another, practically identical with the first excepting that it contains a special tax on income provision.

The tax provision was strongly urged by Senator Jones of Washington, who stated that two members of the House committee had assured him that the section would be carefully considered by that body.

A tax of 50 per cent on net operating income above 6 and not more than 7 per cent of the fair value and of 75 per cent above 7 per cent of the fair value is contemplated, in lieu of all other taxation excepting the ordinary real estate tax.

Financial News Notes

Interest on Bonds Paid.—The Third Avenue Railway, New York, N. Y., has announced an interest payment of 3⅜ per cent on the adjustment mortgage fifty-year 5 per cent income gold bonds payable Oct. 1. This makes the total interest declared for the fiscal year 5 per cent.

Dividend on Account of Accumulations.—The directors of the New York State Railways, Rochester, N. Y., have declared a dividend of $6.25 a share on the preferred stock on account of cumulative dividends due on the senior shares. The dividend is payable Oct. 2 to stockholders of record of Sept. 27.

Seeks Abandonment.—The Michigan United Railway, Jackson, Mich., has petitioned the Public Utilities Commission for permission to abandon a 5-mile line between Frankenmuth and Frankenmuth Junction in Saginaw County. It is said that bus competition is responsible for the company's financial position.

Dividends Announced.—The Duluth-Superior Traction Company, Duluth, Minn., will pay on Oct. 2, 1922, two dividends of 1 per cent each on the 4 per cent cumulative preferred stock for the quarters ended June 30, 1921, and Sept. 30, 1921. In April, 1921, a dividend of 1 per cent was paid on the preferred stock.

Officers Elected.—Directors of the new Norwalk-Shelby Railway have elected the following officers: J. L. Baugh, Indianapolis, president and general manager; C. E. Heath, Plymouth, vice-president; A. D. Sanders, Norwalk, secretary; C. R. Irwin, North Fairfield, treasurer. The company will begin operating the line with gasoline cars about Oct. 1.

Valuations Announced.—The Pennsylvania Public Service Commission recently fixed valuations of two traction properties on petition of the companies for purposes of reorganization. The valuation of the Southern Pennsylvania Traction Company, Delaware County, has been set at $6,700,000 and of the Altoona & Logan Valley Electric Railway, Blair County, in the sum of $6,600,000.

Receiver for Interurban Named.—Judge Duval West, acting for Federal Judge Hutcheson in the United States Court at Houston, Tex., has named I. C. Griffith receiver for the Bryan & College Interurban Railway. The bill of complaint was filed by Louisiana bondholders, who claimed that $50,000 interest was overdue. Mr. Griffith is assistant cashier of the National Bank of Commerce.

Profits Increasing. — The Muskegon (Mich.) Traction & Lighting Company in a report filed recently shows that for the first time in more than two years both the electric railway and gas departments are showing a substantial profit. The profits for May, June and July in the traction department were $13,121. In addition the company paid $9,300 out of its earnings in interest charges.

Booklet on Public Service Corporation Issued.—Bonbright & Company, New York, have issued a booklet of forty-four pages on the Public Service Corporation of New Jersey. It contains a general description of the corporation, its properties and territory, with statements of the corporation securities and most of the securities of the subsidiary and leased companies Earning statements of many of the leased properties are given. The book is well illustrated with many halftones, charts and maps.

Merger Under Consideration. — The possibility of a merger of the Joplin & Pittsburgh Railway, an electric line, with the Northeastern Oklahoma Railway, has been announced by J. J. Heim, president of the Joplin & Pittsburgh line. Contemplated plans for an 11-mile link between Columbus, Kan., and Pitcher, Okla., would give the combined line a total mileage of 250 miles, in the heart of the coal and zinc fields of Kansas, Missouri and Oklahoma. The plans have been filed with the Interstate Commerce Commission for approval.

Traffic and Transportation

Operation of One-Man Cars Would Effect Operating Reduction

George F. Russell, superintendent of Public Utilities, which department operates the Seattle (Wash.) Municipal Railway, claims a reduction of $782,800 a year can be accomplished in the operation of the railway system by completely changing from two-men to one-man cars and that faster and better service will be afforded. This is a part of the program recently started by Superintendent Russell which he states will bring the city nearer to the return of the 5-cent fare.

Superintendent Russell believes that a reduction now from 8⅓ cents to 5 cents would cut off 33⅓ per cent of the revenues. The revenues for the first six months of the year were approximately $3,500,000, or at the rate of $7,000,000 for the year, and a reduction of 33⅓ per cent would bring the revenues under $5,000,000 for the year. He said that his company was working on the program of increased efficiency and reduced costs. One of the main items in reducing operating costs would be the replacing of the heavy two-men cars with one-man cars. An approximate reduction of $782,800 would be the result. Another reduction would be realized in the elimination of certain lines called "policy lines," where cars are operated far beyond a point necessary for efficient service. This would mean a reduction of $145,000, which with the $782,800 saving would put the company, in the opinion of Superintendent Russell, within striking distance of the 5-cent fare.

Bus Petitions Initiated

Initiative petitions in favor of an ordinance regulating the operation of buses in Pasadena, Calif., providing for the issuance of five-year permits and the granting of universal transfers on bus lines operated in Pasadena are being circulated for the purpose of being filed with the city directors.

The resolutions are fostered by the Federated Improvement Association of Pasadena calling on the city officials to submit to the public at a general election in November the proposition to regulate the bus lines. At least two propositions, one from the Pacific Electric Railway and the other from the bus operators, are asked for in the resolution adopted. The association is clamoring for competition in the bus field in order that there may be had the very best of transportation facilities.

The text of the resolution follows in part:

Whereas some of the franchises of the Pacific Electric Railway on streets of Pasadena will expire at various times between the years of 1923 and 1944;

Whereas said company seeks to renew its franchises and asks permits for the operation of bus lines to serve portions of the city not served by street railway lines;

Whereas in addition to the service given by the Pacific Electric local street car lines in Pasadena, service is being given by a number of independently owned and operated bus lines;

Whereas the bus lines are now operated under permits from year to year revocable at the will of the City Council; and

Whereas these bus lines offer, if given a five-year permit, to operate in competition with the Pacific Electric Railway and to do the following things:

1. Give a 5-cent fare and agree to ask no more.
2. Grant a 3-cent fare to school children.
3. Grant universal transfers.
4. Practically double the bus service at once and add new lines as rapidly as the need arises.
5. Give a direct service to parks on holidays.
6. Give ten-minute service instead of all twenty-minute service.
7. Hold one bus in reserve for every three in operation, to provide against tie-ups due to accidents.
8. Form a co-operative company in order that the above betterments may be carried into effect.
9. Offer that the city may take over their business and equipment at any time for municipal purposes, by paying a fair price for it, same to be fixed by disinterested parties.

That the permit asked for is for five years only, long enough to enable the bus lines to install better equipment, more frequent service and new service in portions of the city not now served, and yet not long enough to embarrass the city, should new or better methods offer themselves within that period.

The proposed ordinance sought for five-year term of bus line permits provides that the city directors may in their discretion deny applications, except when a permit request is accompanied by a petition bearing the signatures of at least thirty adult residents of the district to be served. In such an event the directors would be required by the terms of the proposed ordinance to grant the permit so sought.

Another feature proposed by the ordinance is the granting of universal transfers good on all bus lines in the city. It also provides that the city directors shall establish rules and regulations for the operation of motor buses that will not be inconsistent with the ordinance.

Fare Fight in Court

Testimony of City of Fort Worth Heard to Compel Northern Texas Traction Company to Reduce Fares—Seven-Cent Fare Pending Referee's Report

The fight of Fort Worth, Tex., to compel the Northern Texas Traction Company, which owns and operates the street car lines in Fort Worth, to reduce its fare from 7 cents to 6 cents or possibly 5 cents is now before N. A. Dodge, referee appointed by the Federal Court to hear testimony on points involved and make report of his findings to the court. Hearing was held in Fort Worth last week before the referee in which the city presented testimony in support of its claim that the traction company is earning more than a justified return on its investment and that a reduction in fares is warranted at this time.

The Northern Texas Traction Company has been operating under a franchise similar to that under which the Galveston Electric Company was operating when its case was carried to the Supreme Court for decision. The Fort Worth case was very similar and officials of Fort Worth did not push their fight until the decision was rendered in the Galveston case. The Fort Worth franchise gives the traction company the right to fix fares so that a fair return shall be earned on the invested capital, and the only recourse the city has to prevent overcharge in fares is to go into court and show that fares are higher than justified. The traction company raised its fares to 7 cents. Thereupon, the city passed an ordinance directing the traction company to reduce fares to 6 cents. The ordinance was ignored, and the city went into court to compel a reduction. The hearing just concluded is to determine if the city's order calls for a fare that is confiscatory in that it fails to provide adequate return on the invested capital of the traction company.

Numerous points were developed in the hearing and street car service in Fort Worth was compared with similar service in other cities where fares are lower. Invested capital, replacement values, depreciation, and other factors to be considered in rate making were developed at the hearing. The traction company presented its side of the question before the referee several months ago, and the hearing this time was devoted to a presentation of the claims of the city.

H. P. Gillette of Chicago, editor of *Engineering and Contracting*, was placed on the stand as a witness for the traction company. Mr. Gillette declared that the Northern Texas Traction Company is warranted more at the present time in charging a 7-cent fare than in 1920. The valuation of the company's properties in Fort Worth now is $9,133,913, Mr. Gillette declared, as against a valuation of $11,575,513 in 1920. In response to the direct question of "What would happen to the traction company if the car fare had been reduced to 6 cents during the last fiscal year?" Mr. Gillette declared that the company would be facing a deficit of $23,000 at this time, because the 6-cent fare would have been inadequate to pay the operating costs if service is to be maintained at present standard.

The witness cited figures to show that the traction company during the last year earned 2.58 per cent on its valuation, whereas it has been held by Federal Courts in similar cases that a public utility of this kind should be permitted to earn a return of 8 per cent. An increase to 8 cents or 9 cents is more justified than a reduction to 6 cent or 5 cents, he said.

The standard of service maintained

in Fort Worth as compared with service maintained in other Texas cities was an important factor in the hearing and much testimony centered about this point. During the year ending Oct. 1, 1921, the traction company served 28,248,000 passengers, he said, whereas during the year ending June 1, 1922, it had served only 25,809,000 passengers, a decline of more than 10 per cent. This means a reduction of more than 10 per cent in revenues, he said.

The one-man car proved a bone of contention in the hearing. This car is operated extensively in Fort Worth and on some lines the patrons have objected strenuously. The cars were first tried out in Fort Worth in 1915, when ten cars were placed in service. Since that time the one-man car has proved its superiority over the larger cars in economical operation, Mr. Gillette said, and there are now more than 4,600 in operation in this country.

EXCESS SERVICE MAINTAINED

Joseph M. McShane, testifying as an expert witness for the city on the question of standard of service, asserted that the traction company in Fort Worth is maintaining 34 per cent more efficient service than it maintained in 1919, and that the net returns under the 5-cent fare in 1919 amounted to more than the net return in 1921 under the the 7-cent fare. This condition he attributed to an excess in service maintained. Curtailment of service would permit the traction company to reduce fares to 6 cents or even to 5 cents he asserted without lowering the net revenue. Testimony of Mr. McShane was attacked by W. E. Tucker of Boston and Sam B. Cantey, Fort Worth, counsel for the Northern Texas Traction Company, and the witness was forced to admit that his study of the operation of the Northern Texas Traction Company had been somewhat cursory. He also was forced to admit that his assertion that the company is maintaining 34 per cent excess service was in error, that the real excess should be stated at about 25 per cent.

George H. Clifford, general manager of the Fort Worth traction lines, took the stand on the closing day of the hearing. Mr. Clifford admitted that the service maintained in Fort Worth is superior to that maintained in Dallas and in other Texas cities. Mr. Clifford said that Mr. McShane in comparing service rendered under the 7-cent fare with service rendered prior to that, had taken 1919, which was the greatest year in the history of the traction company in regard to passengers carried, and had compared that year with 1921, which was the poorest year in the history of the company when measured by actual net returns.

The city attacked the contract between the local traction company and the interurban under which the traction company is paid 2½ cents per mile for use of its lines within the city limits by the interurban company.

A report by the referee to the court is not expected for a period of sixty days or longer, as attorneys for both sides are given thirty days in which to file written briefs, and the referee is expected to take at least thirty days for an examination of these briefs and formulation of his report. In the meantime the traction company continues to collect a 7-cent fare.

Weekly Pass Meeting with Favor in Washington

Figures presented by the Puget Sound International Railway & Power Company, Everett, Wash., show that its weekly pass plan is meeting with the approval of the riding public. The records show that 10,204 through pass rides were enjoyed the first week by the public for the sum of $404, or an average fare of 3.96 cents. Somewhat larger sales and equal approval are reported by the Bellingham lines, which also sell the pass at $1. While the cash fare in Everett is 10 cents, almost everybody used four tickets for 25 cents before the pass came. In Bellingham the cash fare is 7 cents and tickets are sold at fifteen for $1, the ticket sales, however, being small on account of the amount required for purchase.

Hearing on Railway Application for Bus Permit

The State Railroad Commission of California will hold a hearing in San Diego on Sept. 15 on the application of the San Diego Electric Railway for a permit to operate an auto bus line as a feeder to the San Diego-National City-Chula Vista interurban railway line. If granted, the company will establish its bus line over a route about 5 miles in length, connecting with the interurban street railway at Eighth Street and National Avenue, National City. It is planned to maintain a fifty-minute schedule except for one hour each morning and evening, when the three Fageol buses to be placed on the run are used in taking from and returning to their homes students of the new Sweetwater Union High School, which has just been completed.

The new bus line would supplement the present railway service.

Lower Fare in Providence Under Consideration

The board of directors of the United Electric Railways, Providence, R. I., recently authorized President Potter to file with the Public Utilities Commission special rates for school children eighteen years or under. The new plan, by which tickets would be sold in strips of ten for 40 cents, will mean a reduction in fare amounting to 2 cents. The tickets will be good for riding to and from school and will carry the same transfer privilege as the cash fare.

Mr. Potter said that a survey was being made in Providence of fare systems. He added, however, that he did not believe his company would adopt the pass system.

Offers Five-Cent Fare

A Cut of Two Cents in Regular Fare Proposed by Newport News Railway Head

With a view of doing the greatest good to the greatest number the City Council of Newport News, Va., has approved the plan of J. N. Shannahan, president of the Newport News & Hampton Railway, Gas & Electric Company, to put into effect as soon as possible a universal 5-cent fare. The present fare is 7 cents with half-price work and school tickets. It is expected that the new fare schedule will meet with the approval of the State Corporation Commission. Six weeks will be needed to take care of the legal requirements involved in changing the franchise.

Mr. Shannahan stated that the reduction will be put into effect in every zone on the peninsula. He submitted figures to show that 76 per cent of the peninsula's traveling public will have their car fare reduced 2 cents while about 21 per cent will have it increased 1½ cents. He frankly stated that he did not know whether his company could "get by" on the arrangement but was willing to give it a trial, hoping to secure more riders at the reduced rate.

Members of the Council declared that they believed the men and women who lose the half-price work ticket will benefit in the end as a result of the flat 5-cent fare, they and members of their families having to use the cars at times when the reduced fare does not apply.

In opening his statement of the practicability of the straight 5-cent fare, Mr. Shannahan stated that he had studied the matter from all angles and that the fare could be had in only one way, the establishment of a universal fare at this rate. He could not make special labor and school rates and have his company remain solvent. He added that he was willing to try the straight fare and make reports to the Council. In answer to a question he stated that the average fare is 6.11 cents and that the only way to make up for the loss of revenue is to carry more passengers.

The percentage of fares was then brought out, showing that labor tickets are but 18 per cent of the total number of fares.

In regard to the reduction President Shannahan said that it would be impossible for the company to give this reduction without the ordinance recently passed regulating the use of the city streets by jitneys and buses.

Under the plan not only would the fare within the city limits be reduced to 5 cents, but the fare on the interurban lines would be lowered also. The fare to Hampton would be 10 cents instead of 14 cents and the fare to Old Point and Buckroe would be 15 instead of 21 cents.

Appreciation of Mr. Shannahan's offer was expressed by the Mayor and by members of the Council. Councilman Smith characterized the plan as a "clean-cut" proposition and that the only question was whether the people of the city wanted a 5-cent fare.

Recommends Drastic Changes in Traffic Regulation

In co-operation with the Los Angeles Traffic Commission the Automobile Club of Southern California has just completed an extensive study and report on its plan for relieving congestion in the city of Los Angeles. The principal measures recommended include the widening of city streets and the elimination of cars from some of the downtown streets. The report states that if traffic congestion continues after making drastic changes then all cars should be removed from the downtown congested area and a belt line or loop system of railways should be built. The report was filed on Aug. 30 and copies were submitted to the Board of Public Utilities, City Planning Commission, Chamber of Commerce and other civic bodies.

The report contains a map showing the location of the proposed new streets and charts showing the population curve and other causes of congestion, also extensive information concerning the manner of dealing with traffic problems in other cities. The report of the club was prepared by its consulting engineer, J. B. Lippincott. It consumed one year to prepare the completed report, with the engineer in charge using forty assistants.

Weekly Pass in Pine Bluff

Another railway announced recently its intention of putting into effect the weekly pass plan. This is the Pine Bluff (Ark.) Company, which started on Sept. 4 the selling of $1 passes good for an unlimited number of rides between Monday morning and Sunday night. The plan also provides that school children may enjoy the same privilege for 50 cents a week, provided they are able to present certificates showing that the students are bona fide pupils in the public or private schools. The new plan will make no change in the cash fares, which will remain at 6 cents a ride.

Hearing Set on Suit of Puget Sound Property

Preliminary to the litigation in Federal court this fall, which is expected to have a bearing on the adoption of a 5-cent car fare for the Seattle (Wash.) Municipal Railway, the city recently filed with the Circuit Court of Appeals in San Francisco its brief in the so-called "specific performance" suit brought by the Puget Sound Power & Light Company. Hearing has been set for Sept. 18, when the high tribunal will sit in Seattle.

This is the case in which Federal Judge E. E. Cushman in the District Court rendered a decision favorable to the power company, which was seeking to have the general fund of the city made security for the $15,000,000 of bonds with which the street railway was purchased from Stone & Webster. Since that decision the State Supreme Court has interpreted the statutes of this State as forbidding any invasion of the city's general tax funds for the purpose of operating and maintaining the street car system, and the city had appealed from the decision given by Judge Cushman. The city will be represented by Corporation Counsel Walter F. Meier, T. J. L. Kennedy, first assistant, and Robert H. Evans, special counsel.

Fare Dispute in Dallas

Petition to Mandamus City to Compel Reduced Fare—Appeal Against Six-Cent Fare Collection

The fight to compel the city of Dallas, Tex., to reduce fare by repealing the ordinance granting an extension of the 6-cent fare to the Dallas Railway has found its way into the courts. Two petitions are now pending, one seeking to mandamus the Mayor and City Commissioners to compel them to act on the petition filed on July 24 asking that the ordinance granting the extension of the 6-cent fare be submitted to the qualified voters of the city for approval or rejection under the referendum provision of the city charter.

The legal department of the city of Dallas had held that the fare extension ordinance carried an emergency clause and under the charter provisions is not subject to referendum. The petitioneers seeking the referendum, on the other hand, allege that there was no emergency and that the fare extension ordinance should not have carried the emergency clause but should have become effective only after the regular period of thirty days.

SEEK TO ENJOIN COMPANY

The other petition seeks an injunction restraining the officials and agents of the Dallas Railway from collecting 6-cent fares, or any other fare than the 5-cent fare provided in the original franchise granted to C. W. Hobson and his associates in 1916. The latter petition has just been filed in the district court by the same petitioners as filed the former petition with the City Commission and later filed petition for mandamus to compel the City Commissioners to act on their petition.

The petition seeking an injunction cites provisions of the original franchise and alleges that any action by the city in increasing fares except as provided in that franchise was in violation of law and void. The petition further asks that in case the 6-cent fare is not immediately set aside, the court order the Dallas Railway to issue receipts for fares paid by its patrons so that in case the 6-cent fare is set aside later the patrons may secure refund of excess fares paid.

W. M. Holland, president of the Dallas Railway, and Richard Meriwether, vice president and general manager, are named in the petition as agents of the defendants.

The petition also asks the court to compel the defendants to deposit the amount of the monthly difference between the 5-cent and the 6-cent fare if the order for a temporary injunction is not given by the court, and designates the difference between the two rates of fare as $500 a day. The claim that the 6-cent fare is being collected illegally is repeated in the petition.

The petition also cites that the 6-cent fare ordinance would not go into effect legally until it had been voted upon by the electors of the city of Dallas, in conformance with the charter, because a scale of 5-cent fares is designated under the original Hobson franchise, which was voted upon by the people.

Will Seek Review of Commission's Fare Order

The city of Alhambra, Calif., served by the Pacific Electric Railway lines, is preparing to go before the Supreme Court and charge the State Railroad Commission with unfair discrimination. Alhambra has taken exception to the recent ruling of that body which reduced the fare to South Pasadena and has ignored the claims of Alhambra for a similar reduction, although the mileage to Alhambra is considerably less than to South Pasadena. T. C. Gould, city attorney, has announced his intention of asking legal representatives of other cities adjacent to Los Angeles to join with him in requesting a writ of review. The commission ruling which reduced Hollywood and South Pasadena fares was reviewed in the *Electric Railway Journal* issue of Sept. 9.

Transportation News Notes

Weekly Pass Plan in Effect.—The Pacific Power & Light Company, Astoria, Ore., began on Sept. 4 issuing weekly passes on the railway lines at $1 each, good for an unlimited number of rides by the holder during the seven days following the issuance. This company is the first in Oregon to adopt this plan.

Wants to Restrain Buses.—The Mayor of Houston, Tex., has indicated that he will secure submission to the voters in November of a proposal to prohibit the operation of jitneys in that city. Electric railway facilities have recently been increased by the expenditure of more than $1,000,000 by the Houston Electric Company.

Plea for Permanent Transfer Points.—Electric railway companies of Dayton, Ohio, have requested the City Commission to curtail transfer privileges. It is alleged that the transfer privilege is being abused. Permanent transfer points are being sought. Railway officials claim that in some cases it is possible for a person to go downtown on one line, get a transfer and reach home on another for a single fare plus a 1-cent transfer charge.

Personal Mention

Mr. Shryock Advanced Again

E. O. Shryock, who was recently appointed superintendent of the light, power and transportation departments of the Columbus, Newark & Zanesville Traction Company at Zanesville, Ohio, has a long service record in electrical utility work behind him.

In June, 1906, he was employed by the Meadville Traction Company, the Meadville & Cambridge Springs Street Railway and the People's Incandescent Light Company, which were jointly operated. While in their employ, he was connected at various times with practically every department. In February, 1909, Mr. Shryock was made superintendent of a new division then being operated under the name of the Meadville & Conneaut Lake Traction Company, holding this post until 1913, when these companies were consolidated under the name of the Northwestern Pennsylvania Railway and the Northwestern Electric Service Company. At this time he was made superintendent of transportation of the Meadville-Cambridge Springs Division, Meadville Division and the Meadville and Conneaut Lake Division.

Later in 1913 the Erie Traction Company was consolidated with these companies and Mr. Shryock was made superintendent of transportation and purchasing agent for the combined systems. In the following year he was promoted to be general superintendent, which position he held until 1920, when he resigned to become superintendent of railways of the Northwestern Ohio Railway & Power Company, with headquarters at Oak Harbor. This position he resigned in June, 1922, to become superintendent of transportation of the Columbus, Newark & Zanesville Traction Company at Zanesville. He was promoted to the general management of the company's local properties on Sept. 1 when the resignation of B. S. Watters went into effect.

Spanish Railway Officials Visiting Here

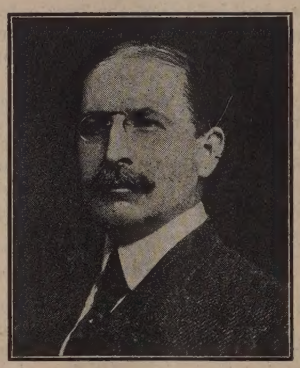
Señor Don José Moreno Ossorio, general manager of the Norte Railway in Spain, and several other Spanish railway experts who are working out plans for the proposed electrification of the Norte Railway recently made a tour of inspection through the East Pittsburgh works of the Westinghouse Electric & Manufacturing Company.

The other members of the inspection party were Don Mario Viani Caballero, chief engineer of the motive power department, Norte Railway; Prof. Don José A. Pérez del Pulgar, professor of electrical engineering Instituto Católico de Artes e Industrias, and R. F. Hamilton, consulting engineer of the Sociedad Española de Construcción Naval, which represents the Westinghouse Electric International Company in Spain.

The initial electrification on the Norte system, which is one of the largest in Spain, will include about 40 miles of line running from Ujo through the mountainous Pajares section in the north. Three thousand volts direct current will be used in this section, and water power will be purchased from the Electra de Viesco Company in Asturias. More extensive electrification work is planned for the future of the Madrid-Venta de Baños section of this Spanish railroad.

John E. Wilkie Assists General Manager of Chicago Surface Lines

John E. Wilkie, a vice-president and director of the Chicago (Ill.) Railways, is made assistant general manager of the Chicago Surface Lines under a new organization plan. His department, in addition to handling routine matters of the general manager's department in the absence of that officer, will have charge of publicity and public relations, real estate transactions and records and all complaints relating both to service and personnel.



J. E. WILKIE

By thus placing in the control of one executive the reception and adjustment of complaints both as to service and employees, the management recognizes the importance of these features of public relations as affecting the reputation of the company with its patrons. It also assures a co-ordination of effort between the complaint and transportation departments, which it is hoped will work to the decided advantage and profit of the company. Mr. Wilkie is a former newspaper man who, for sixteen years before joining the forces of the Chicago Railways in 1913, was chief of the Federal Secret Service in Washington.

E. R. Kelsey Resigns at Toledo

Edward R. Kelsey, for twelve years in charge of the publicity department of the Doherty company, has resigned. He will become scout executive for Toledo, Ohio. Mr. Kelsey was a newspaper reporter before 1910, devoting part of his time to the interests of the Toledo Railways & Light Company. In 1910 he left newspaper work to become manager of the publicity department at Toledo. In 1912 he was appointed general passsenger agent.

W. B. Yereance has completed his contracts with the Eighth and Ninth Avenue Railroad companies, New York, and has relinquished his office of general manager and chief engineer of those properties.

R. F. Clute has been appointed supervisor of the Charleston Consolidated Railway & Lighting Company, Charleston, S. C. He succeeds A. H. Roberts, who resigned recently. Mr. Clute has been an inspector and dispatcher for the company for several years.

Edward Roach is in charge of the installation of the electrical equipment on the lines at Muncie and Anderson, Ind., of the Union Traction Company of Indiana. Bradford Fields is in charge of the installation of the high-tension lines under construction between the Muncie substation and Eaton power plant and between the Muncie and Selma substations.

C. H. Evenson has been appointed assistant general superintendent of transportation of the Chicago (Ill.) Surface Lines. Mr. Evenson entered the service of the Chicago City Railway in 1910. For a number of years he was secretary to the president of the Surface Lines and for the past two years has been employed in the transportation department.

Paul Warwick has been appointed assistant director of the public relations department of the Georgia Railway & Power Company, Atlanta, Ga. The change is effective Sept. 1, according to an announcement by Lincoln K. Starr, director of the public relations department. Mr. Warwick, who has been secretary of the Georgia Committee on Public Utility Information, was formerly Mr. Starr's assistant with the Georgia company. He succeeds "Fuzzy" Woodruff, who has held the position the last several months and who resigned to take up newspaper work again.

J. M. McElroy, one of the leading tramway authorities in Great Britain, has been presented by the Manchester Tramways Committee with a silver tea service on the occasion of his retiring through ill health as general manager of Manchester Corporation Tramways, a post which he has held for twenty-two years. The chairman of the tramways committee and the Lord Mayor of Manchester bore high testimony to the value of the work accomplished by Mr. McElroy, voicing the sorrow of all concerned that it was necessary for him to retire.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Pulverized Coal Installations on Increase

One Manufacturer of This Class of Equipment Reports Record Orders, Which Include Many Converts in the Electric Railway Field to Use of the New System

EVERY utility is interested in anything that has to do with the use of coal. In the operation of the power plant, the first problem just now happens to be how to get the coal to burn. That is a temporary or passing condition, however, so that, after all, the problem resolves itself into what coal to get and how best to use it after the coal has been purchased. At first, the criterion was to get as good coal as possible and then to burn it as economically as possible, but with coal prices at their present level and the prospects very remote of any very large decrease in the price of fuel, increased attention is being paid to the possibilities contained in the use of low-grade fuels with mechanical means called upon as an aid to securing better power station results.

Pulverized Fuel Effects Operating Economies

It is just here that pulverized coal has forced its way to the front as a possible aid to economy when properly used. At least one large utility plant has been built entirely with the end in mind of using pulverized fuel, and the tendency has been constantly growing among other power users to turn toward the use of coal in pulverized form. In the particular case to which reference has just been made the installation contemplated that the utility should pulverize its own coal in its own plant, but this was merely an incident in the operation and if anything emphasizes the advantages of the use of the pulverized fuel.

No matter what the coal market conditions or technical considerations may be that govern this tendency, the fact that more and more companies are turning toward the use of pulverized fuel is a development too important not to merit very serious consideration everywhere. Among the latest converts to the use of pulverized fuel are the United Electric Railways, Providence, R. I.; the West Penn Traction Company, Pittsburgh, Pa.; the Rochester Railway & Light Company, Rochester, N. Y.; the Duquesne Light Company, Pittsburgh, Pa., and the Union Electric Company, St. Louis. All of these companies are on record as having placed orders recently with the International Combustion Engineering Corporation for the installation of the Lopulco system, and that company reports bookings for combustion equipment during August for more than $900,000, exceeding by more than $200,000 the record of any previous month. This is the recent record of just one manufacturer of this class of equipment.

Installation in Milwaukee Successful

The Philadelphia Rapid Transit and the Milwaukee installations for burning pulverized coal, described previously in the *Electric Railway Journal*, are of course among the most important of the kind so far made in the public utility field. The significance of the results of the Milwaukee installation in particular is doubly important as the installation there has apparently more than justified the faith of its sponsors, for among the latest companies recorded as turning toward the use of pulverized fuel is found the Union Company, also a subsidiary of the North American Company along with the company at Milwaukee.

Thus is the record set down of a tendency among power users that seems to have great impetus behind it. Therein may lie a lesson for power uses elsewhere. As for the company making the equipment, the intending purchaser may not be interested in the extent to which the producer is prospering because all his plants are now being run to capacity, but even that fact is not without significance for the power user, although he may not be interested in the details of the figures of the manufacturer's output. In the case of the International Combustion Engineering Corporation this output includes also the products of the Underfeed Stoker Company.

$3,000,000 Power Development Planned

The Potomac Public Service Company, which purchased the Hagerstown & Frederick Railway, together with holdings at Eddes Fort along the Cacapon Creek in Morgan County, West Virginia, will erect a hydro-electric station, costing about $3,000,000. The company hopes to supply power within a radius of 75 miles of the plant.

A dam will be built at Eddes Fort, which will impound water that will drain an area of 672 square miles. The lake will flood an area of 5,000 acres. It will be 165 ft. high from the bed of the creek.

The company has secured options for a distance of 30 miles or more. It will require two years to complete the work. The setting of the lake in the natural woodland will no doubt result in the formation of a summer colony along its banks.

Inasmuch as many miles of the country road will be flooded, the company will provide a highway of concrete the whole length of the lake. The large dam will be of concrete construction and will be more than 700 ft. in length at the crest. The company will develop approximately 30,000 hp. High-tension transmission lines will be built to connect the company's lines over four states.

Westinghouse Company Receives French Railway Contract

An order covering the complete control equipment for 120 electric locomotives, now under construction, has been received by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., from the Paris-Orleans Railway of France as part of an electrification contract amounting to approximately $8,000,000.

The Paris-Orleans Railway, which is one of the largest systems in France operating over 5,000 route-miles of track, is electrifying 125 miles of its main line between Paris and Vierzon. This is the first of an extensive program laid out by the Paris-Orleans for the electrification of its lines.

The complete order of control equipment will be manufactured in the United States and shipment of this order will commence in January, 1923, and extend to December, 1924.

Rails Will Cost More

The United States Steel Corporation announced on Sept. 13 that the price of standard steel rails would be advanced from $40 to $43 per gross ton on Oct. 1.

This is the first advance made in the prices of rails for many months and is accepted as marking the beginning of the resumption of the upward trend in prices.

Formal announcement made by the corporation said:

Until Sept. 30, 1922, the price of standard rails will continue to be $40 per gross ton base f.o.b. mills for deliveries to be made in about equal monthly instalments prior to June 30, 1923. Commencing Oct. 1, 1922, the price will be increased to $43 per gross ton base f.o.b. mills for same deliveries.

Metal, Coal and Material Prices

Metals—New York	Sept. 12, 1922
Copper, electrolytic, cents per lb.	14.00
Copper wire base, cents per lb.	15.625
Lead, cents per lb.	5.90
Zinc, cents per lb.	6.70
Tin, Straits, cents per lb.	32.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$8.375
Somerset mine run, Boston, net tons	5.125
Pittsburgh mine run, Pittsburgh, net tons	4.625
Franklin, Ill., screenings, Chicago, net tons	4.375
Central, Ill., screenings, Chicago, net tons	4.325
Kansas screenings, Kansas City, net tons	2.75
Materials	
Rubber-covered wire, N. Y., cents per lb.	6.25
Weatherproof wire base, N.Y., cents per lb.	16.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N.Y., cents per gal.	91.50
White lead, (100-lb. keg), N.Y., cents per lb.	12.50
Turpentine, (bbl. lots), N.Y., per gal.	$1.29

Rolling Stock

New York & Queens County Railway, New York, N. Y., has leased fifty cars of the Third Avenue Railway. These will replace some of the bad order equipment of the Steinway lines operating in Long Island City.

Boston (Mass.) Elevated Railway placed an order during the month of July for forty steel cars of the elevated type for operation in train service in the East Boston tunnel upon completion of the Maverick Square Terminal.

Louisville (Ky.) Railway, now that the new franchise ordinance has been finally arranged, is expected to purchase about 80 one-man cars under the plan calling for the expenditure of $900,000 in improvements.

Chattanooga, Tenn.—The first gasoline motor car will be placed in operation out of Chattanooga by the Tennessee, Alabama & Georgia Railway. The car was purchased from the Service Motor Truck Company, Wabash, Mich. For the present the motor car will make a round trip to Gadsden and will be run on the same schedule as the steam passenger trains.

The Cincinnati (Ohio) Traction Company has ordered seventy motor and control equipments for new cars from the Westinghouse Electric & Manufacturing Company. The outstanding feature is the application of Westinghouse cabinet type control, which simplifies the operation of cars. This type of control was first tried out successfully in Cleveland, Cincinnati being the second city to adopt it. The seventy cars are being built at the plant of the Cincinnati Car Company.

Track and Roadway

Cincinnati (Ohio) Traction Company will order at once the necessary material for the installation of tracks and switches in connection with the rerouting plans.

Trenton & Mercer County Traction Corporation, Trenton, N. J., is making a number of improvements to the roadbed at Hopewell, N. J., and raising the rails at several points.

Muskegon (Mich.) Traction & Lighting Company is placing its profits in improvements to the line. The work of double-tracking the line in the business section of the city has been completed.

Toronto (Ont.) Transporation Commission has commenced work on the double-tracking of Yonge Street from Woodlawn Avenue to the northern city limits. The street will then be paved.

The Connecticut Company, New Haven, Conn., through President Storrs has notified the Mayor of Hartford that it is ready to lay its share of the pavement on Windsor Avenue. New rails and roadbed will be laid. The expenditure will approximate $75,000.

Eureka (Calif.) Street Railway has materially improved its roadbed since January of this year. The rails have been straightened out, new ties used and trolley wires replaced. The cars have been remodeled and rebuilt and a new rotary converter has been installed.

Fresno (Cal.) Traction Company will likely begin work on its $85,000 extension program on Oct. 1. E. A. Devereux recently announced the arrival of ten car loads of rail and a large quantity of ties to complete the extension of Adlington Heights and the Fresno Avenue extension.

Columbus, Delaware & Marion Electric Company, Marion, Ohio, may build a new belt line in Marion. It became known that the company bought a right-of-way 20 ft. wide in Uhler Road in Vernon Heights addition. In case the company builds a belt line the Center Street line will be used as a feeder, it is said.

Pacific Electric Railway, Los Angeles, Cal., was authorized by the California Railroad Commission to construct three tracks at grade across Pico Avenue and the Southern Pacific Company to relocate its railroad track across Pico Avenue in Long Beach. The changes follow a relocation of the industrial district of Long Beach.

Dallas-Terrell.—Extension of the Dallas-Terrell line of the Texas Interurban Company, to Mineola and Tyler which is expected to be placed in operation before the end of 1922, is being sought by commercial interests of these and other East Texas cities and towns. The matter has been placed before the officials of the companies interested in building the new interurban line.

Groton & Stonington Street Railway, Groton, Conn., has completed negotiations with the state highway department of Connecticut for the purchase of 1,800 ft. of trackage over the Thames River at New London, Conn., including the approaches on both sides of the bridge. The highway department when the bridge was built two years ago, laid the tracks over the bridge since at that time none of the street railways were in a financial condition to pay the expense of construction. State Highway Commissioner Bennett has agreed to sell the trackage for the sum which it originally cost the state, $3,800. The full amount will be paid the State before the trolleys begin to operate over the bridge.

Power Houses, Shops and Buildings

Savannah Electric & Power Company, Savannah, Ga., has recently completed repairs on the two steel stacks of the Indian Street power plant.

Springfield (Mass.) Street Railway has offered to pay $3,000 toward the cost of building a cement bridge at Frog Hole, in Westfield, Mass., the bridge being on the company's route between the two cities. The bridge is to be 30 ft. wide and will cost $30,000.

Trade Notes

Globe Railway Equipment Company, St. Louis, Mo., has been incorporated with a capital stock of 20,000 shares of no par value to manufacture and deal in railway machinery, equipment, devices and all articles pertaining to railway lines.

G. P. Atkinson, who has been associated with the Weston Electrical Instrument Company for the past six years, will also represent the Ward Leonard Electric Company in the Atlanta district. Mr. Atkinson has established an office in the Atlanta Trust Building, Atlanta, Ga.

Rail Welding & Building Company, Cleveland, Ohio, announces the addition to its staff as sales engineer of L. R. Berkeley, E. E. of Cornell University, who has been associated for a number of years with the sales and engineering departments of the National Carbon Company. Mr. Berkeley will cover the territory of western Pennsylvania, Ohio, Indiana, Kentucky, and Michigan. He replaces A. C. Sullivan, resigned.

L. D. Miller, Stamford, Conn., formerly Eastern representative International Motor Company, has made public plans which he is prepared to carry out for the leasing of buses to electric railway companies. Under this plan, the lessor supplies all service, including driver, gasoline, oil, repairs and public liability insurance for a limited period at a price determined by the mileage operated. It is expected, however, that this price will be approximately 30 cents per bus-mile.

New Advertising Literature

R. D. Nuttall Company, Pittsburgh, Pa., has issued Bulletin No. 32 giving thirteen important points of the Nuttall Form 13-E Trolley Base.

Erie Electrical Equipment Company, Johnstown, Pa., has issued a new catalog of fittings and other construction devices. A large number of special fittings have been developed by this company which are of particular value for construction of outdoor substations and automatic substations.

Brown, Boveri & Company, Baden, Switzerland, have issued a well-illustrated 100-page bulletin giving descriptions of the manufacturing plants and of the products of the company. A large section is devoted to electric traction on main line and interurban railways, in the development of which this company has played an important part.

Crouse-Hinds Company, Syracuse, N. Y., has issued a complete and attractively bound book on Condulets. The Catalog known as No. 2000 containing 713 pages has been carefully compiled to show in a comprehensive manner the various devices manufactured by the company for use in conduit installations and known under the trade name "condulets." The catalog is replete with illustrations.